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THE EFFECT OF STRAIN ON THE HEART*

BY PAUL D. WHITE, M.D.†

THE effect of strain on the heart has been a subject of great interest and importance for generations, but we are today in a better position to discuss it than has been possible before. From laboratory experiments and from clinical investigations have come constantly, in recent years, new observations which give us a clearer idea of the influence of various factors on the circulation, though difficult problems still remain unsolved. The arteries, capillaries and veins, muscular movements, respiration and gravity all have important functions to perform in maintaining the circulation and in aiding in its adjustment to various conditions, but the heart must continue to be regarded as the chief mechanism in the distribution of blood throughout the body, and as we shall see, it must be viewed as a double organ with the effect of strain sometimes on both sides, but often preponderantly on one side only.

The effect of strain on the heart concerns not only the experimental pathologist, the physiologist, the general practitioner and the specialist in cardiovascular disease, but it concerns us all. We must know not only the effect of strain on the normal heart but also the effect of strain on the diseased heart. The subject is one of large scope as it must be borne in mind not only that there are various kinds of strain and each kind of strain may vary in degree, but also that the heart itself may vary in its strength, reserve power, and degree of health. Finally there may act on the same heart simultaneously various kinds and degrees of strain. With so many variables, it is obvious that but general statements can be made, and these must be applied to each individual case with great care. Here the experience and wisdom of the clinician in the practice of medicine are of utmost importance in the weighing of evidence which will determine the diagnosis, prognosis and treatment of disturbances of the circulation. I can here but outline briefly the effect on the heart of strain in general and that of various individual factors. The complex assembly of individual factors in special cases must be passed over with mention merely of some of the more frequent groupings.

The direct effects of strain on the heart vary essentially with the kind and degree of the strain and the condition of the heart to start with. Slight strain may affect a diseased heart even more than marked strain a normal heart. The constant repetition of strain, that is chronic strain, may be completely taken care of by the cardiac reserve; if it is not, the myocardium must meet the strain by increasing in strength. Its tone first is improved; then comes actual increase in bulk with enlarged muscle fibers and probable increase in capillary circulation. Whether general cardiac dilatation and muscle injury must always precede actual hypertrophy is not yet clear; sometimes, at least, this appears to be true. Then with increasing or persistent strain and decreasing reserve the heart begins to fail. If the strain is on both ventricles the signs of failure may indicate this—congestion of lungs, liver and neck veins, dependent oedema, and finally general anasarca with orthopnea and cyanosis. But where the strain is largely unilateral, then the hypertrophy and dilatation may be largely limited to the right or to the left ventricle and failure may start in that ventricle, the other maintaining its work, perhaps too effectively for a while, until it fails also. In aortic valve disease, chronic hypertension and often coronary disease, especially where there is thrombosis of the descending branch of the left coronary artery, the left ventricle hypertrophies and dilates, with little change in the right ventricle. Then comes failure with dyspnea and pulmonary oedema and general slowing of peripheral circulation accompanied by oedema of the feet. If the failure is acute, we may have in such cases cardiac asthma, probably due fundamentally to the inability of the left ventricle to take care of the blood being sent to it by the more vigorous right ventricle. In mitral stenosis, on the other hand, or in infarction limited to the right ventricle the immediate effects are different. The right ventricle is hypertrophied and dilated. Its failure is shown in large part by its inability to take care of the blood which it receives. Engorgement of neck veins and liver, ascites and finally general anasarca develop. The pulmonary circulation also is slowed. The preponderant failure of one ventricle does not generally last very long; the other ventricle also fails or the first ventricle recovers. When right ventricular failure is added to left ventricular failure, some of the dyspnea and pul-

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†For record and address of author see "This Week's Issue," page 847.

monary oedema may actually decrease, but signs of right ventricular failure are added. The balance is a delicate one and all gradations and relative degrees of failure of either ventricle or both may occur. Dr. G. Canby Robinson has recently called our attention anew to the importance of this ventricular balance.

Acute strain may be, and usually is, well taken care of by the cardiac reserve, but if the heart is weak or the insult a severe one, as in coronary thrombosis, acute dilatation of the heart may occur. This is less common than the use of the term itself which has been applied wrongly to all sorts of conditions such as paroxysmal tachycardia and syncope.

Heart strain may be *intrinsic or extrinsic in origin* and I propose to consider first the intrinsic factors, which are what we generally regard as structural defects or lesions, and disorders of rhythm. Frequently there is a combination of disordered heart beat and diseased valve or muscle, which results in incapacity and death where neither one alone might be dangerous.

A. INTRINSIC FACTORS

1. Let us consider first *valvular disease* as a condition giving rise to heart strain. Years ago valvular regurgitation and stenosis were the chief topics discussed under the subject of heart disease; then in recent times the pendulum swung far to the other extreme and the condition of the myocardium was regarded as of paramount importance and fully able to compensate for the valvular defects. Now we appreciate that no matter how good the heart muscle may be, it may fail under the burden of long continued marked valvular disease. We must view with considerable respect a high degree of mitral stenosis or of aortic regurgitation; aortic stenosis and mitral regurgitation are less serious. Slight valvular involvement is compatible with long life and full physical and mental activity, but even in such a case the heart usually shows some enlargement. Generally speaking, the greater the degree of either regurgitation or stenosis of any valve, the greater is the strain on the heart, often unevenly distributed to one or the other ventricle; the greater this strain the shorter the life. Given aortic regurgitation, for example, if the defect is a slight one there may be no symptoms whatsoever through a strenuous long life; the heart may be but very slightly enlarged and the blood pressure normal. If the defect is of high degree, the heart becomes enormous, the pulse pressure extensive and life is usually shortened, no matter what the condition of the muscle, though of course a healthy myocardium will hold out longer than one that is diseased. How to keep the myocardium healthy in such cases is often a problem. Avoidance of infections and of undue fatigue is of the greatest importance. The heart is already exercising energetically where the valves are deficient and one is apt to conclude that no extra bodily exercise other than the routine quiet daily life should therefore be allowed. But it is probable that some exercise, if not severe and if well tolerated, helps the heart by improving the tone of the circulation in general. A state of physical fitness and of good physical training is undoubtedly an asset and if the heart can stand a slight to moderate amount of healthful exercise, it should in turn be benefitted. Much judgment must be applied in individual cases.

a. *Mitral disease* acts in various ways as a strain on the heart. If *regurgitation* is preponderant—and such a condition does exist—there is extra work for the left ventricle, as in aortic regurgitation, and for the left auricle and the right ventricle. The strain results eventually, if the mitral regurgitation is of sufficient degree, in hypertrophy of the whole heart with dilatation of the left ventricle and left auricle. The left ventricle has to hold enough blood to make up for the amount regurgitated into the left auricle, and to increase in muscle mass sufficiently to take care of this increased work of pumping blood in two directions. The left auricle tends to be dilated by the blood regurgitated into it during ventricular systole, and the right ventricle increases in strength and in muscle mass to overcome the back pressure from the left ventricle. Eventually as the heart fails the right auricle also may dilate, but it is not primarily affected. With chronic marked mitral regurgitation either ventricle may fail from the strain, or both together. It is one of the few conditions which act as an immediate strain on both sides of the heart.

With the development of functional mitral regurgitation due to dilatation of the mitral ring in failure or dilatation of the left ventricle as in chronic hypertension, coronary thrombosis or aortic regurgitation, the right ventricle, too, is put under a strain where previously only the left ventricle had been affected. The right ventricle then enlarges and in its turn may fail.

Mitral stenosis puts a strain on left auricle and right ventricle both of which frequently become very large and fail, usually with the appearance of auricular fibrillation. The left ventricle may remain unaffected or even seem smaller than normal with the decreased work. With the decreased oxygenation of the blood in the lungs cyanosis appears; this is probably due to the insufficient exposure of the venous blood to the alveolar air because of the swelling of the pulmonary blood vessels. The pulmonary pressure is raised and there may be pulmonary apoplexy. When the right ventricle fails, the pulmonary circulation becomes slowed, there is more stasis there because of the drop in pressure, but the chief signs of the failure appear in the form of engorgement of the veins of neck and arms, congestion of the liver and finally peripheral oedema and increased cyanosis.

It must be remembered that all grades of mitral regurgitation and mitral stenosis exist with combinations of the two. An attempt has been made by surgery to convert marked mitral stenosis into a certain degree of mitral regurgitation, as yet unsuccessfully. It is likely that mitral stenosis and regurgitation combined, each of moderate degree, exert a less serious strain on the heart than either condition alone, if of high degree.

b. *Aortic valve disease* acts primarily as a strain only on the left ventricle, whether there is stenosis or regurgitation. The left ventricle hypertrophies and dilates, but only as it fails and mitral regurgitation develops is there a direct effect on the other chambers of the heart, though there is an indirect and probably very important deleterious effect on the coronary circulation in cases of marked aortic regurgitation. Aortic stenosis is a less serious lesion than aortic regurgitation except when the regurgitation is of but slight degree. It is found not rarely in old people with fairly competent hearts. I regard it as a favorable complication of aortic regurgitation and have seen angina pectoris decrease in severity in a young man when stenosis developed to reduce the degree of aortic regurgitation. With aortic stenosis alone clinically or with aortic stenosis and regurgitation combined the heart is less enlarged than with aortic regurgitation without stenosis. This may be due in part to the bad effect on the coronary circulation of marked aortic regurgitation. Physical examination, X-ray study and electrocardiography all reveal the enlarged left ventricle found in many cases of chronic aortic valve disease, just as these same methods show the large right ventricle in well marked mitral stenosis. When the left ventricle fails, the peripheral circulation is decreased; but the first definite evidence usually comes in the form of dyspnea and pulmonary oedema, and sometimes acute attacks of cardiac asthma, probably due primarily, as already stated, to congestion of the pulmonary circulation (with secondary reflex asthmatic breathing) because of the inability of the left ventricle to dispose of the blood passed on to it by the more normal right ventricle. With recovery of the left ventricle by rest, bleeding, morphine or digitalis therapy the pulmonary oedema and orthopnea disappear. The same thing may happen temporarily when the right ventricle fails in its turn and blood accumulates in the liver, and when the oedema is peripheral instead of in the lungs.

Aortic regurgitation associated with luetic aortitis is generally much more of a strain on the heart than that due to rheumatic endocarditis. The lesion is apt to be more extensive, it is more progressive, and there is often associated coronary orifice involvement in the aortitis with still greater diminution of coronary circulation. Almost the largest heart known is found with marked aortic regurgitation—the cor bovinum, the size indicating in this instance at least the importance of the strain from the valvular lesion.

c. *Tricuspid valve disease* of any great moment is very rare and may be dismissed with the observation that it acts on the right side of the heart, whether stenotic or regurgitant in type, much as does mitral disease on the left side. When it is present, it is usually overshadowed by the much more important and marked mitral disease.

d. *Pulmonic valve disease* is also uncommon; as an acquired defect it is very rare and whether regurgitant or stenotic in type acts on the right ventricle much as aortic valve disease acts on the left ventricle. Congenital pulmonic stenosis if of high degree is very serious, is usually associated with marked enlargement of the right ventricle, often with associated congenital cardiac defects and with cyanosis and a short life. The cyanosis in such cases is due primarily to the right to left shunt of unoxygenated blood through a septal defect and not to the pulmonic stenosis itself.

2. *Congenital defects of the heart* vary very much in the strain they cause. Some are of little or no significance, like small septal defects or patency of the ductus arteriosus, to be found only on routine physical examination; others are so complex and serious that they allow survival for only a few minutes, hours or days after birth. There are all degrees of strain represented. In general it may be said that the degree of strain in the victim varies in proportion to the cyanosis. Circulatory failure and death in such cases frequently are precipitated by infections, like pneumonia.

3. *Pericarditis* sometimes acts as a great burden for the heart and sometimes it, too, is negligible. There may be a transient unimportant pericardial friction rub leaving perhaps a milk spot, or there may be an extensive pericardial effusion endangering life by its rapid accumulation, with pressure on the heart and great vessels. Paracentesis here may save lives, but usually the degree of effusion is such that tapping is not necessary. The orthopneic position with great distress particularly in breathing and a marked paradoxical pulse are often evidence, aside from thoracic signs, of the presence of a massive effusion. The speed of accumulation makes a great difference; a slowly gathering tubercular effusion may be well supported even when enormous.

Chronic pericarditis may also vary in its effect on the heart dependent on its degree and location. If the heart is adherent to diaphragm, ribs or mediastinum and at each contraction must pull on these structures, it is under great strain and may become very large, mainly due to hypertrophy of the left ventricle but sometimes of the whole heart. Some of the largest hearts of all are found with chronic mediastinopericarditis, 1,000 grams or more in weight. There may be chronic obstruction and stasis with engorgement of the liver giving rise to Pick's Disease. So-called cardiolysis—removal of the ribs to which the heart it attached—has in rare cases afforded relief to the overworked heart. Frequently chronic adhesive pericarditis is so slight in degree that there is no heart strain at all and no enlargement, and the condition therefore may not be diagnosable during life.

4. *Coronary disease*, whether arteriosclerotic or infectious in nature, acts as a strain on the heart by cutting down the blood supply. The greater the degree, the greater the strain. Coronary anastomoses and the efficiency of the Thebesian circulation may vary very much in different individuals and the same degree of coronary disease may thus act very differently in different people. Generally actual coronary thrombosis is a serious burden; it may result in hypertrophy as well as dilatation, the latter apparently coming first, which would seem to substantiate recent opinion that injury to heart muscle may precede hypertrophy. Whether lesser grades of coronary disease may also cause increase in heart weight is still open to question. It would seem possible that increased demand on that part of the myocardium which still functions well may cause it to increase in bulk. The strain of coronary disease may be on either ventricle but is more marked usually on the left, especially when there is actual coronary thrombosis. The left ventricle may fail suddenly or slowly.

5. *Myocardial disease*, not due to coronary involvement, but *infectious* or *toxic* in nature, may place a very great burden on the heart. An acute myocarditis, as in diphtheria or rheumatic fever, may precipitate failure and death. It is likely that a few chronically damaged enlarged hearts have resulted from real myocarditis, usually of unknown but sometimes of luetic origin.

6. *Disease of the great vessels*, although strictly extracardiac, may best be included here. There is, so far as we know, no especial strain on the heart from lesions of these great vessels themselves if the heart is not simultaneously involved, except under two circumstances. Stiffening of the aortic wall with loss of elasticity does, doubtless, increase the work of the heart by reducing the co-öperation of the aorta in maintaining a satisfactory circulation. The strain from this is probably not very great, however, and is readily taken care of; usually the heart does not hypertrophy. Arteriovenous aneurysms and patency of the ductus arteriosus, if extensive, do very materially increase the work of the heart and cause left ventricular enlargement somewhat like that caused by aortic or mitral regurgitation. Correction of the arteriovenous aneurysm causes the heart to decrease in size. Ordinary aortic aneurysms or aortitis do not affect the heart appreciably unless the coronary orifices are involved or aortic valve deformed.

7. *Disturbances of cardiac rhythm* may sometimes, if marked, cause cardiac strain. Premature contractions, or extrasystoles, whether auricular or ventricular in origin, rarely, if ever, are any kind of a burden for the heart. If they occur so often (every other beat or more frequently) as to interfere with the efficiency of the circulation, the myocardium, too, may be slightly affected, but such a condition is very uncommon. Paroxysmal tachycardia, auricular flutter and auricular fibrillation, on the other hand, do, through the speed of the heart, impose a burden on both ventricles which may result in heart failure, if very long continued at a very rapid heart rate, especially if there are other factors like valvular or coronary disease or hypertension. Flutter and fibrillation are more important than paroxysmal tachycardia, except that of ventricular origin, which is generally associated with serious heart disease. Heart block is a strain for the heart only in reducing the coronary circulation if the pulse becomes extremely slow. Rare disturbances of rhythm like auriculoventricular nodal rhythm or sinoauricular block are of little moment.

B. EXTRINSIC FACTORS

Extrinsic factors causing heart strain are of far less importance than the intrinsic factors already discussed with two exceptions. They are hypertension and hyperthyroidism.

1. *Hypertension*, either with or without renal disease, is a great burden for the heart if the blood pressure remains high for a long time. The higher the pressure and the longer it is maintained, the greater the strain. The effect is primarily on the left ventricle with enlargement, found usually by physical examination, X-ray and electrocardiogram. Eventually the left ventricle may fail and the symptoms and signs of this failure, already mentioned, may appear. The course may be shortened by the coincident effect of coronary disease, uremia or other complication, but a myocardium apparently in good condition and even enormously hypertrophied may fail because of the chronic burden of the hypertension alone. The higher the diastolic pressure, the worse the prognosis. The cause of essential hypertension is still open to question, but apparently it is due to increased peripheral vascular resistance. Bazett makes the interesting observation that "if the minute volume of the heart be kept constant,

and a 12 per cent. diminution in length of [circular] fibers occurred in all of the arterioles, since these offer the main part of the resistance, the mean pressure would have to be almost doubled."

2. *Hyperthyroidism* may be a cause of important heart disease and failure unless diagnosed and treated early. Even lesser grades undoubtedly increase the work of the heart, but the severe grades impose a great burden on the circulation with tachycardia and increased pulse pressure associated with the increased metabolic rate. It appears doubtful if any actual toxic myocarditis occurs and the ultimate effect may be simply that of cardiac muscle exhaustion. Operation, if properly done, generally puts an end to this heart trouble.

3. *Exercise and work.* That very vigorous exercise and work may prove too great a strain for a diseased or untrained heart is unquestioned, but under proper conditions the most strenuous exertion is well borne by a healthy heart. There is still some doubt about the possibility of the heart's enlarging as the result of exercise. Abnormal hearts undoubtedly may enlarge, both acutely and chronically, but the normal heart probably increases only a little in size at most; its reserve is great. DeMar, the champion Marathon runner, shows no cardiac enlargement by X-ray or physical examination, but some observations on professional athletes abroad have indicated that there may be slight enlargement of the heart in professional cyclists, oarsmen and ski-racers. This seems reasonable from comparison with animal studies. The hearts of athletic animals are larger than those of non-athletic animals of the same size, whether of the same species or different ones. For example, the heart of the hare is relatively three times as large as the heart of the rabbit. William Harvey, in his memorable disquisition on *the Motion of the Heart and Blood in Animals* published just three hundred years ago, wrote as follows: "The more muscular and powerful men are, the firmer their flesh, the stronger, thicker, denser, and more fibrous their heart, in the same proportion are the auricles and arteries in all respects thicker, closer, and stronger." It is not likely that hypertension alone accounted for these observations of Harvey's. Exercise must be prescribed for people with heart disease with care, but as already stated, if the heart is competent, a little exercise is probably beneficial. The poor physical condition resulting from total abstinence from exercise is not conducive to the best of health. A man with aortic regurgitation but otherwise in good health and accustomed to some exercise is likely to be a better risk in a serious infection or operation than a lazy fat man with a normal heart.

The so-called *athletic heart*, as I have seen it, has consisted simply in effort syndrome or in an "irritable heart" in a nervous overtrained or undertrained person and not in heart disease.

The factor of long years of *hard physical work* in the production of coronary sclerosis is still an uncertain one. Senility, hypertension and syphilis probably played a part in some of the cases so designated years ago.

Military service has sometimes been blamed for the production of heart disease, but practically all soldiers with heart symptoms and signs can be shown to belong to the familiar groups of effort syndrome or of organic heart disease due to rheumatic, luetic, hypertensive or arteriosclerotic factors. Rarely extreme strain in military service may perhaps do direct harm. The usual "soldier's heart" is, of course, simply the effort syndrome.

Tests to determine the efficiency of the heart, whether of the nature of exercise or of respiratory tests, concern physical fitness as a whole rather than cardiac fitness in particular.

It is of interest to note that in the quiet, relaxed, upright position the heart is under less strain than when the body assumes the recumbent position, due in large part to the difference in the amount of blood flow in these positions. Sufferers from cardiac asthma, angina pectoris decubitus, or simple orthopnea appreciate this fact tremendously.

4. *Accidents* do not act as a special heart strain unless of very unusual nature affecting the heart directly by injury or by causing rare valve rupture. When heart disease is found after accidents, it was almost invariably present before but not recognized or looked for. Accidents may precipitate cardiac symptoms, however, as a kind of "last straw" and to that extent may be considered responsible. For the accident insurance board it should be possible to grade the compensation according to the responsibility of the accident, as is the law in Kentucky, and not to be obliged, as in most states, to consider it wholly or not at all responsible.

Cardiac accidents and strain may readily result from *constipation*, chiefly due to the effort, which may sometimes be very great, expended in defecation. Here the strain, which is essentially that of the Valsalva experiment, may precipitate angina pectoris or cardiac asthma in a diseased heart, although a normal heart withstands the effort easily. Coitus also may cause angina pectoris or cardiac asthma or increase of congestive failure in a heart with little or no reserve.

5. *Pregnancy.* For the normal heart pregnancy is not a strain. Doubtless it does increase the work of the circulation, including that of the heart, and there may even be some temporary increase in heart size. Most of the apparent increase in the size of the heart in the later months of pregnancy is due, however, to its upward displacement by the abdominal tumor. Cardiac patients vary markedly in their ability

to stand the strain of pregnancy and childbirth. In general, they go through it all right, but each case must be carefully judged by itself and followed conscientiously. Marked mitral stenosis, marked aortic regurgitation, marked cardiac enlargement and auricular fibrillation make termination of pregnancy advisable; congestive failure demands such a measure.

6. *Obesity* and *overeating* are important strains only for a diseased heart, but they are often associated with conditions like hypertension and coronary disease that cause heart damage. Much of the so-called fatty heart is a misnomer, cardiac symptoms in an obese person coming from poor general physical condition with faulty muscular tone throughout the body —really a type of effort syndrome—or else from real heart disease associated. Probably actual encroachment or invasion of the heart by fat is of little moment except when it indicates a disease process. A hearty meal may precipitate angina pectoris and coronary thrombosis, and thus occasion the wrong diagnosis of "acute indigestion".

7. *Infectious diseases,* although doubtless increasing the work of the heart somewhat during the height of fever and tachycardia and depressing the myocardium when there is much toxicity, do not exert any great particular strain on the normal heart unless they actually cause heart disease, as in the case of serious rheumatic fever or diphtheria. The routine administration of digitalis, therefore, in infectious disease appears unwarranted, although with the greater acute strain in pneumonia it is possible that it may do some good. This still remains open to question and even in pneumonia it may be wisest to withhold cardiac stimulation unless it is obviously needed, either as an emergency measure or in the treatment of known cardiac patients (and perhaps old people). Most failure in infectious disease is due to vasomotor and not to cardiac collapse.

8. *Disease in other organs* may cause strain to the heart, usually of but slight degree. Pulmonary disease by displacement of the heart or by increasing the work of the right ventricle, distention of the abdomen with gas or fluid and pressure upward on the heart, and nephritis by producing uremic intoxication are examples of disorders which may affect the heart. Most local diseases or focal infections, like cholecystitis, apical tooth abscess or prostatitis, act if at all, on the heart only to irritate it. Premature beats or even paroxysmal tachycardia or angina pectoris may be precipitated temporarily, to clear up when the local disease is relieved. However, angina pectoris and myocardial disease are not actually caused by such a condition. They are merely increased or brought to light, although it is possible that degenerative or inflammatory changes in the coronary arteries may be initiated or hastened by reaction to focal infection; that is still an open question. Hypertension and diabetes appear especially to favor the occurrence of angina pectoris.

9. *Anemia,* whether secondary or primary, is, if severe, quite a burden for the heart in that the myocardium is directly affected. Dilatation may result, murmurs appear, and angina pectoris be precipitated.

10. *Nutritional diseases,* beri-beri in particular, may cause myocardial weakness, degeneration and failure. It is possible that in slight degree they may frequently cause some trouble.

11. *High altitudes* exert a definite strain on the circulation, including the heart, if high enough to reduce the oxygen content of the air considerably. Some individuals can adjust themselves easily to high altitudes; others do so with difficulty, whether or not there is heart disease. It is likely that altitudes below 10,000 feet impose relatively little burden on the heart if healthy, but for patients with heart failure low altitudes are desirable.

12. *Anesthesia and surgical operations* exert a variable strain on the heart but less on the heart, apparently, than on the nervous control of the circulation. If anesthesia is well given and operations are well performed, both cardiac and non-cardiac patients stand the strain well. There are rare cardiac accidents, now and then paroxysms of tachycardia, usually of little moment, and rarely failure; most trouble of circulatory type is of the nature of shock, for which cardiac therapy is not necessary. It need hardly be said that in preparation for operation digitalis is rarely required. Of the general anesthetics at present ether and ethylene seem to be particularly favorable from the standpoint of the circulation.

13. *Forced fluids.* The custom of the forcing of fluids, much in vogue in therapy in late years, is not always without its drawbacks, one of which is undue strain on the heart. This, if the heart is weak, may actually lead to congestive failure. That the ingestion of great quantities of fluid may actually lead to cardiac hypertrophy and failure is indicated by the occurrence of the *beer heart* in Europe.

14. *Alcohol, tobacco, coffee.* There is little evidence that these substances produce any deleterious effect on the heart except transiently as irritants, or through its toxic effect in the case of marked chronic alcoholism. It is, however, quite certain that disturbing disorders of cardiac rhythm like paroxysmal auricular fibrillation may actually follow overuse of alcohol, tobacco, or both combined. Excessive use of tobacco has in some cases precipitated or increased angina pectoris.

15. Finally, we come to the *effect of nervous* (mental and emotional) *strain* on the heart. Through nerve action this is undoubted, and in this present era, when nervous strain is almost a continuous one for people in many communities, it is doubtless more of a factor than ever

before. Business, professional and social competition is extremely active. The telephone and automobile are always exciting our nerves. The so-called effort syndrome, angina pectoris, and perhaps, too, hypertension and presenile arteriosclerosis, appear to be increasing; nervous strain is probably in part responsible.

In addition to the factors of cardiac strain that I have discussed there are doubtless others not known or poorly understood, but I have presented enough to show the complicated situation which may be found in a given individual and the care that is needed in the analysis of cardiac strain. On the whole, however, the heart is an extraordinarily powerful organ, resisting strains of all kinds with great ability.

THE TEACHING OF PERCUSSION*

BY FRIEDRICH v. MÜLLER, M.D.†

INSTRUCTION in percussion and auscultation is a necessary part of the medical course. It is intended to introduce the beginner to the difficult art of unprejudiced observation of the sick, and at the same time it offers him the opportunity of more personal interchange of ideas with his teacher than is usually possible in the clinic. The course is also instructive to the teacher, who must familiarize himself with the principles of the method.

Many physicians believe that the art of percussion and auscultation is out of date, or that it is supplanted by the X-ray and the tuberculin test; but it is just as indispensable to-day as it was a hundred years ago. It is not only not supplanted by the X-ray, but the art of percussion and auscultation is much more necessary in order correctly to interpret the X-ray picture. Above all, it has gained certainty since being controlled by the X-ray. Formerly the correctness or error of percussion could only be recognized at autopsy. To-day, however, we are able to study the dependability of the results of percussion in living people and under natural conditions. Among other things, it is a blessing that the Roentgen films have enlightened us in regard to the errors of an over refined technic of percussion and auscultation.

Given a patient who shows a mild elevation of temperature, who has lost strength and weight and who perhaps complains of night sweats, the physician is already almost convinced that he is confronted with a tuberculous affection of the apex of the lung; and it then requires no little degree of self criticism indeed, not to find a slight difference in the resonance of the apices and somewhat sharper expiration, and to seize upon this as evidence of a tuberculous illness. The studies of Heineke in Germany and of Rist in France have shown how frequently such erroneous diagnoses have occurred. These are a misfortune for the sick man; not only because he is torn from his work, and he and his family are burdened with worry, but the erroneous diagnosis brands the tuberculosis suspect as an invalid, and makes him a hypochrondriac, since it directs his attention in too exaggerated a degree to his own condition. I have twice had the following experience: A diagnosis of tuberculosis was made by physicians of excellent reputation in a pregnant woman because of slight differences in resonance and breath sounds at the apices. As a result abortion was induced, with an unfortunate termination. Autopsy revealed no evidence of the existence of pulmonary tuberculosis. We must remember that slight twisting of the cervical spine with corresponding variations in the position of the ribs may give rise to differences in the resonance of the apices, and that the breath sounds are commonly not quite identical on both sides, even in healthy apices. On the other hand, the X-ray plate has revealed to us that those pea and bean sized foci which represent the primary lesion, and which ordinarily are not found at the apices at all, are quite incapable of recognition by means of auscultation and percussion. To me it is as though one should fill two similar boxes with cotton, place in one of them a pea or a bean, and then demand that we ascertain by thumping and listening to the boxes which of the two contains the pea.

We next consider the essential characteristics of the percusssion sounds, and examine their dependability. This is much more easily possible to-day than in bygone years, since the acoustical technic of telephony and sound amplification has shown us new methods and given us valuable apparatus.

The *Inventum novum* of Auenbrugger was the work of a gifted artist, and accordingly his description of the percussion note is not a definition of physical characteristics, but represents impressions of a general nature. Music itself was at first only an expression of artistic emotion, and not until later did it prove necessary to recognize tones correctly, and to seize and transcribe them in notes so that the melody might be shared with others. Auenbrugger speaks of a *sonus clarior* or *obtusior,* and Skoda translated these expressions into the German words "resonant" and "dull" (*hell und dumpf*). This was an unhappy rendition, for it may be gathered from Auenbrugger's naive Latin that by *clarior* he means not clearer or more resonant (*heller*), but more distinct (*deutlicher*), and by *obtusior* or *obscurior,* nothing but indistinct (*undeutlich*).

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It may easily be demonstrated that the resonant percussion note of the lung is much louder than that over a pleuritic exudate or the heart and the liver. For in a large auditorium the lung resonance may be heard clearly in the most distant benches, while percussion over an exudate or a solid organ gives rise to no audible sound at this distance. As is well known, the amplitude of sound diminishes according to the square of the distance. Furthermore, our phonographic records show much greater amplitudes for lung resonance than in percussion of a dull area.

As a keen observer Skoda recognized that the terms resonant and dull do not suffice to characterize the percussion note, and he considered it necessary to introduce along with them the expressions full and empty. His definition of these two qualities of sound is highly obscure, and just what physical characteristics he wished thereby to express is difficult to recognize from his descriptions. Adolf Weil accordingly undertook, in his excellent Textbook of Topographical Percussion (1877), to abandon the confusing terms full and empty, and he advocated that only the loudness, i. e., the amplitude, should be considered worthy of attention.* However, the human ear is an exceedingly one sided instrument, which is incomparably more sensitive (a hundred times) to the high tones than to the deep ones, and which is correspondingly quite unable to compare the amplitude (the loudness) of a high and a low note. The result was that Weil denied the existence of right sided cardiac dullness in the healthy human being, and therewith by implication was forced to admit the impossibility of correctly determining the right border of the heart by percussion. That is to say, in healthy persons very often the right-sided cardiac dullness shows not so much a fainter as a higher note, and accordingly one cannot speak of a diminution of amplitude or of dullness (*Daempfung*=dullness or damping) i. e. damping in the true sense of the word.

Other observers, as for example Karl Gerhardt, held to the Skodaic distinction of sounds, without however being able to demonstrate clearly the physical significance of full and empty. Now since, quite correctly, in the common usage of the medical practitioner the expression has become general that the sound over a diseased apex is "shortened", it has occurred to me that perhaps the Skodaic terms full and empty may refer to the *duration* of the tone vibrations. Indeed, we have already recognized with the unaided ear that the sound over aerated lung or over a pneumothorax is definitely more prolonged than that for example over a pleural exudate. It is astonishing that the ear is able to perceive definitely such slight differences in the duration of sound, which are a matter of less than ½ second. Selling and recently Martini were able to bring out the proof of the correctness of this observation by means of their curves, and indeed it is possible to hear and demonstrate that in the slow dying away of the normal lung note it is always the deep fundamental tones of the percussion note that alone persist, while in the absence of such deep tones the sound is short, and as Martini has shown, over a pleuritic exudate only a single vibration is recorded. The full note which is distinguished by its long duration is accordingly always a deep sound, and the empty sound is distinguished by its short duration. However, I must say that my conception of the Skodaic terms as prolonged and short was long since quite clearly emphasized from another aspect, and indeed by a man whom we now know solely as the great founder of physiological chemistry: Hoppe-Seyler. Felix Hoppe, who at that time had not yet assumed his second name, in his paper "On the Theory of Percussion" in the 6th volume of *Virchows Archiv* in the year 1854 classifies the percussion note according to the following physical categories: (1) *Pitch*, i. e. the frequency of vibration per second. (2) *Intensity*, i. e. loudness. (3) *Period of vibration* or the number of vibrations elicited by a definite impulse. (4) *Timbre*, or color of the sound, by which he understands chiefly the "purity of tone", i. e. the absence of bytones and overtones. In this point too, Hoppe was right in the end, for it has been demonstrated by the researches of R. May, Lindemann, Edens, Martini and myself that the tympanitic note of the air-containing gastrointestinal canal gives pure sine curves, while the non-tympanitic lung note presents a much more complicated curve form, in which can be recognized higher oscillations at the beginning, and at the end of the curve only the deep fundamental tone. Skoda had already designated the tympanitic note as "ringing", and noted that its pitch could be easily recognized because it had a dominant tone like that of a glass cylinder. Theoretically one might accept the possibility of a pure deep tone being perceived in percussion over a pneumothorax, which would then have to be called tympanitic. Actually, however, the expression "tympany" in reference to the note heard over the chest and abdomen is restricted to the high pitched sounds (from 250 to 500 vibrations per second), in which the deep tones are completely lacking. Many physicians designate as tympanitic only a high pitched, ringing sound.

It was likewise Hoppe who directed attention to the fact that by percussion we set into vibration not so much the lungs and the other internal organs, but rather the chest and belly walls, which are curved surfaces; that we bring them out of their condition of equilibrium and set them into vibration, and that their transverse vibrations set up longitudinal waves in the surrounding air, and set our eardrums in motion.

*From the perusal of Skoda's own elucidation of his use of these terms it appears fairly clear that he refers to the volume of sound. For example he says that no matter how loudly a note is played on one violin the sound produced is not comparable to that produced by several violins playing the same note.—R. W. B.

He pointed out that an effusion of fluid in the pleural space or an infiltration of the lungs impairs the vibratory ability of the chest and belly walls just as do the heart and liver, and in the physical sense effect a damping of the vibrations, but that such damping can be just as well effected by pressure from without upon the chest wall.

Not until recently did Turban bring forth the proof of this in his *Paralipomena* (*Muench. med. Wchnschrft.* 1927 Nr. 33). If forcible pressure is brought to bear upon the posterior side of the chest wall near the vertebral column, the vibratory ability of the spinal column is so weakened that there is true dullness assuming the form of the Rauchfuss triangle even in the parts adjacent to the spinal column on the other side of the chest. Turban correctly concludes that the Rauchfuss triangle on the other side of a massive pleural exudate is explained by the damping effect which the pleuritic exudate has upon the vibratory ability of the backbone and the adjacent ribs of the other side. If one percusses the spinal column from the neck down to the sacrum in the midline one can easily convince himself that the percussion note down to about the first thoracic spinous process is faint; it then becomes loud, below the scapula is somewhat louder, and at about the level of the lower border of the lungs, i. e. in the region of the liver and kidneys, it suddenly becomes faint. Now, since in the lower part of the thorax *anterior* to the vertebral column lie not the lungs, containing air, but the posterior mediastinum and the heart, and since a moderate unilateral pleural exudate causes a pronounced dullness of the vertebral column, one may therefore conclude that the vertebrae set up resonant vibrations wherever resonant aerated lung lies paravertebral (i. e. along the bodies of the vertebrae, which project deep into the interior of the thorax) and that hence these vibrations of the vertebral column occur *laterally*, and are dependent upon the vibratory ability of that paravertebral portion of the lung which lies along the vertebral column and projects far posteriorly. By our percussion, therefore, we probably achieve more than the setting up of a vibration in the direction of the thrust. The behavior of the vertebral percussion sound thus contradicts the teaching of Goldschneider, who implies that we can direct the path of percussion according to the direction of the thrust. The chest wall, as well as the vertebral column, vibrate upon percussion not so much in the direction of the thrust as, rather, according to their flexibility.

Hoppe further showed that the thickness and above all the tension of the chest wall are of great significance in regard to its resonance and thereby the loudness of the percussion note. When intrathoracic pressure is increased, as in coughing or by the Valsalva maneuver, percussion elicits a feebler note, and if a child cries loudly during percussion, the note is dull. If, by chance, we percuss the other side of the child's thorax during inspiration, we find a much louder note, and we are in danger of regarding the side first percussed as being pathologically dull. It is stated by d'Espine, Turban, Ranke and many others that by percussion of the interscapular space one can demonstrate an enlargement of the hilus glands. I believe that this hypothesis rests upon a misconception. The hilus glands lie about in the middle of the thorax and mostly in the region of the bifurcation, which lies anterior to the dorsal spine. This in turn extends inwards almost to the middle of the thoracic cavity. However, we frequently find in the interscapular space a somewhat fainter note than in the lower paravertebral regions. I believe this dullness of the interscapular space is accounted for not by an enlargement of the hilus glands, but that it corresponds with the border of the cap of the trapezius muscle. Therefore this dullness is particularly well observed in muscular, healthy men, and it appears the more clearly the more this muscle is tensed. This can be shown by first percussing the interscapular space in a man with the muscles relaxed, and then asking him to grasp the back of a chair and lift it forwards horizontally. The dullness then, during the contraction of the trapezius, becomes much more distinct than when the patient puts the chair down again. If an enlargement of the hilus glands, which seldom exceed the size of a walnut, could be percussed from the back, one would have to demand with equal right that the cardiac dullness or an aneurysm be demonstrable from behind. Contrary to Turban, I have, however, never been able to percuss the cardiac dullness in the back, and an aortic aneurysm only when it extended along the spine in the paravertebral space.

The great significance which the vibratory ability of the chest wall has in the production of the percussion note appears further from the observation that throughout the chest wall there is dullness wherever it exhibits a sharp curve as, for example, where there is an angular break in the sternum or the spine, and especially in kyphoscoliosis; if we percuss the same portion of lung in a bend of the ribs, first at the peak of the acute angular bend of the *angulus costarum*, and then close by in the region of the flat area of the ribs, we hear first definite dullness and then a loud note. The ribs are not so resonant at the apex of an angular bend as where they are flat.

The resonance of the chest wall, and consequently the loudness of the percussion note are determined, as Hoppe correctly insists, not only by the tension, as for example by intrathoracic pressure, but above all by the resonance of the organs which lie within it as well. These, be it directly through the thrust or be it through the vibrations of the wall, are likewise set into vibration, if they are capable of it, and indeed these organs can only move according to their own

nature. The nature of the thrust which sets up the vibration is of relatively minor significance. The resonance of the vibrated organ is of much more importance, and this, according to Martini, is dependent upon its module of elasticity and therefore its mass. With increasing module of elasticity, the pitch increases and the loudness diminishes. Soft, non-air-containing organs like the liver, heart or the muscles of the extremities are manifestly not capable of vibration, or tone production, since they are only pressed upon but are not set into vibration by the thrust. These vibrations of the internal organs combine with the vibrations of the chest wall in that they impress their own vibrations upon it. Martini has experimentally shown that the teaching of Helmholtz concerning impressed vibrations ("erzwungene Schwingungen") holds for the chest wall, and that the particular note of the air containing organs becomes more dominant than that of the chest wall itself.

If we percuss the lungs from above downward to the diaphragm along the lateral aspect of the chest, we hear the note become fainter, higher and shorter about 3 or 4 cm. above the lung border. This "relative dullness" may be explained in two ways: A plate, for example a dinner plate, whose margins are resting on a firm support, is most vigorously set into vibration, as Hoppe declares, if it is struck in the center. If we strike it close to the supported edge, it gives forth a fainter, higher note. Similarly, the chest wall in the region of solid organs, such as the liver and the heart, to which it is closely adjacent, shows a diminished vibratory ability. According to this explanation, we must naturally deny that the width of this relative dullness has any significance. I do not believe, however, that this explanation is in complete accord with our observations in man. We see that the relative dullness is wider when the diaphragm is high, and that when we have a low diaphragm or even in seropneumothorax the transition from a very loud to a very faint note is sharp. The second, more plausible explanation arises from the fact that a thin strip of aerated lung gives a fainter, higher and shorter sound than one of greater depth. Martini has experimentally shown that a piece of lung 2 to 5 cm thick does indeed sound higher and fainter than one which is more than 5 cm. in thickness. Fahr and Brandi percussed the relative dullness and the lung border laterally and marked them by means of metal strips. By placing the patient in front of the X-ray machine, similar stages of respiration being maintained, it was then possible to establish the depth of the wedge shaped lung margin in the region of relative dullness. They agreed with Martini that this depth was 3 to 5 cm. A wedge of lung of this thickness thus does not give the same loud and deep characteristic note as a thicker piece of lung. It is therefore immaterial whether we percuss this relative dullness heavily or lightly. We shall obtain the same borders in either case. Obviously this rule must also hold for the relative cardiac dullness, which we are accustomed to consider an expression of the actual size of the heart. We shall therefore always find the relative cardiac dullness just at that point where the overlying bit of lung is no thicker than 3 to 5 cm. On this account we shall in general percuss the heart too small when the covering layer of lung is of greater thickness, and this is indeed frequently the case, namely over the right auricle and the great vessels. The central shadows (vena cava, aorta and pulmonary artery) do not cause dullness under normal conditions, and they only betray themselves if they lie unusually close to the chest wall. Otherwise percussion over the sternum gives highly uncertain results, because this broad, long bone lies partly over air containing and partly over solid organs, and acts like a huge pleximeter. It vibrates more or less as a whole whether it is percussed above or below, on the right side or on the left. Percussion of the sternum is therefore not suitable for the percussion of borders. Comparison of the relative cardiac dullness with the orthodiagram silhouette or a teleo roentgenogram shows us that percussion is apt to indicate the heart smaller than it really is, not only in the presence of emphysema and abnormal depth of the sterno vertebral diameter, but often also in elderly people. On the other hand, an increase in the relative cardiac dullness is always certain proof of a pathologic enlargement of the heart. Since it has been shown that a thin portion of lung has a characteristic note which is fainter, higher pitched and shorter than that of a thicker portion of lung, it must be immaterial whether we percuss the relative dullness and thereby the relative cardiac border with heavy or light blows. I feel quite certain that the border of relative cardiac dullness is the same with either heavy or light percussion. The teaching that we should percuss the relative cardiac dullness with vigorous blows because only such blows will penetrate to the heart and set it into vibration is obviously incorrect. Again, although Goldschneider says that he gets accurate results with his minimal percussion, Moritz does the same with vigorous percussion. If two such reliable investigators can correctly determine the size of the heart by different methods, an unprejudiced third person may conclude that the force of the percussion blow is not important. To be sure, my experience in the course in percussion does show that the relative cardiac dullness is usually more clearly perceived through gentle percussion, and forcible percussion over the precordia is not desirable because so frequently the impulse is transmitted to the stomach and sets it into vibration with a tympanitic note.

Inasmuch as our observations show that only a thin strip of air-containing lung, at most 5 cm. in thickness has a fainter and higher characteristic note than a thicker portion, and that the lung note when the thickness is greater than this

shows no notable change, we must conclude that an infiltration, a tumor or an aneurysm which is covered by a portion of lung more than 5 cm. in thickness cannot be demonstrated by percussion whether it be gentle or vigorous. This hypothesis is confirmed by observation. For example, pneumonia is usually only demonstrable by percussion (or for that matter by auscultation) several days after the clinical onset, and even then only if it extends near to the surface of the lung. The X-ray will usually show in the preceding days a definite consolidation extending out from the hilus. In former times, if a large aneurysm or a big tumor of the lung, not demonstrated *intra vitam* by percussion, were found at autopsy, there was always the possibility that percussion had not been sufficiently careful. Nowadays, an aneurysm or tumor of the lung cannot escape the X-rays, and we are in a position to carefully re-examine the living patient to see whether or not the deep, firm mass betrays itself by an area of dullness. Yet even the most painstaking percussion will not show this if the solid, non-resonant mass does not extend fairly near to the chest wall.

The terms resonant and dull, or loud and faint, are of course always relative. Auenbrugger and Skoda as well, insisted from the beginning that only comparison with a similar area, usually that symmetrically corresponding, could be used in the recognition of this difference in sound. Never could one make a comparison with the percussion note in another person or with one's recollection of a presumably normal sound. Even in the course in percussion, one may easily prove for himself that such a normal note (over the lung for example) does not exist, and that when a large series of healthy persons is examined, the apex note differs in each one. Indeed it is faintest in muscular and fat individuals—often fainter than in the presence of definite tuberculosis. So that if a candidate during his examination or a physician, makes the note "dullness over both apices" we need draw no unfavorable conclusions in regard to the health of the patient, but rather we shall be entitled to suppose that the investigator was convinced from the outset of the presence of a tuberculous condition, but since he found no clear difference on percussion of the two apices, he prudently announced that both apices were dull. Thus his diagnosis would at least be correct for one of the two sides. Further, we know that tuberculosis by no means has its origin so regularly in the apices as we used to think it did.

Even Auenbrugger had noted that the pitch of the percussion note must be considered as well as its clearness, speaking of a *sonus altior et profundior,* and his, too, is the fine observation: *certum denique est, ubi sonus altior sit ibi sit morbus.* Skoda and the later authors were also aware of this quality of sound, but with this limitation, that the pitch (i. e. the frequency of vibration) could be clearly perceived only in tympanitic sounds; that is to say when a dominant tone occurs. The whole subject of alteration in sounds is concerned with these differences in the range of pitch of tones—a subject which has been discussed so much since the work of Wintrich, Biermer and Gerhardt, but which nevertheless has little diagnostic significance. It is noteworthy that no one ever thought to establish the actual pitch of such a percussion note. After several unsuccessful attempts, I finally made use of funnel shaped resonators, following a suggestion of Roentgen's. We had these made by our institute mechanic in various sizes, out of sheet zinc. They were placed with the small opening (which was about 3 mm. in diameter) in the ear, and the broad base was held near the patient who was being percussed by another physician. The characteristic note of each of these resonators had been previously established with the aid of a piano or string instrument. It at once appeared that the tympanitic sound of the abdominal organs responded to a definite resonator and this one alone, and caused it to ring clearly. In this way a range in pitch from 200 to 400 vibrations per second could be counted. If we connected the wide end of the resonator with a sound recording apparatus, we were able in this way to record its response to the percussion note in the form of a pure sine curve. An attempt to record the percussion note by means of a phonograph without the selective resonator failed because the apparatus itself, together with its recording horn, vibrated too much. This also occurred when May and Lindemann made the same attempt. Martini was finally able to obtain satisfactory curves with the aid of the phonographic capsule of Otto Frank. These showed that the abdominal note had the characteristic of a pure sine curve. Its pitch (i. e. its vibration frequency) harmonized at a frequency of 250 vibrations per second with those tones which had been obtained through the use of the reso-

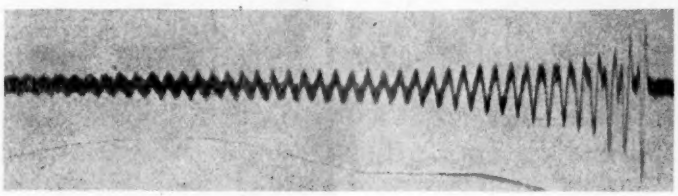

FIG. 1.* Normal lung note, picked up by means of a properly chosen resonator. Number of vibrations 120.

*Fig. 1 to 5 are reproduced from Seifert-Müllers Taschenbuch der med. klin. Untersuchungsmethoden 1928, 24th edition.

nators. Quite recently I have been able to conduct further experiments, working with Dr. Trendelenburg in the experimental laboratory of the Siemens works and using the modern apparatus constructed by him. Inasmuch as all ordinary microphones (i. e. the carbon microphone)

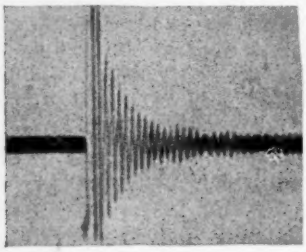

FIG. 2. Loud, high, tympanitic, shorter abdominal note. Picked up by a resonator corresponding to it. ($c'=256$ vibrations.)

It is evident from these curves that the resonator answers to the percussion sound with a corresponding magnitude, and is set in continued vibrations by the sound when its own fundamental tone is struck.

had been found useless because of the adventitious noises which they produced and because, moreover, they poorly reproduced aperiodic vibrations of short duration, a condenser microphone was used as the recording apparatus, and the waves thus produced were amplified by

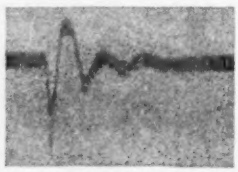

FIG. 3. Deep lung note of pulmonary emphysema (direct reception by Martini without resonator). 76 vibrations.

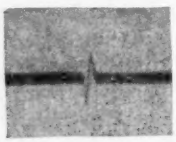

FIG. 4. Quite faint (empty, *leer*) and short percussion note over a pleural exudate. Picked up by Martini with a Frank capsule and a string galvanometer.

means of suitable amplifying tubes. The waves were recorded with the oscillograph made by the Siemens company, as these permit the recording of much more rapid vibrations than the Einthoven string galvanometer which we had previously used. The curves of the tympanitic abdominal note which we obtained in this manner again showed the form of pure sine curves, and a frequency of about 250.

Although the pitch of the tympanitic abdominal note was thus determined by means of various concurrent methods, far greater difficulties were encountered in the analysis of the "non-tympanitic" percussion note of the lung. Quite correctly all previous authors were agreed that the percussion note of the normal lung had no single characteristic tone and no dominant note, but was rather apparently a mixture of various tones—in other words it had the characteristics of a *noise*. While the older physics was forced to abandon the analysis of noises and tone quality, we now hope to resume the study of even such complicated phenomena of sound as these under discussion. The first experiment was again made with our conical resonators. It developed that the lung note would not cause any response in the resonators previously used, which were from a third to a half meter in length. Larger funnels were constructed, and not until they reached the length of a meter or more could we perceive a clear resonance. In many instances this corresponded to A major with its 108 vibrations per second. The existence of such deep tones was surprising to us, for we had expected a higher note from the impression gained by listening with the naked ear. It was possible for Martini to verify the correctness of the observations, however, by means of the Otto Frank apparatus. He obtained curves from the percussion note of the normal adult lung showing 100 to ca. 130 vibrations per second. The note of the thorax of the child was somewhat higher, being around 170. The same was true even over partially consolidated lung (170 to 200). In emphysema the frequency of vibration was less than over normal lung, and the deepest fundamental tone was given by a pneumothorax, with 76 vi-

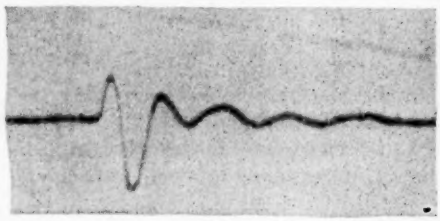

FIG. 5. Normal lung note. Picked up by Trendelenburg and F. Müller with a condenser-microphone and oscillograph. Fundamental vibration 120.

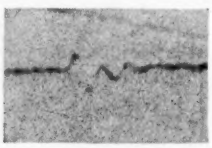

FIG. 6. Normal abdominal note picked up with condenser-microphone and oscillograph. 220 vibrations.

brations per second. This sound corresponds to low E—that is, the deepest bass note which is usually sung in the arias of Sarastro (in Mozart's *Magic Flute*).

Recently Trendelenburg and myself, using the condenser microphone, the amplifying tubes and the oscillograph, studied the normal lung note. We found the frequency of vibration to be 100 to 140.

However, these phonographic curves of the lung note and also those made with the Frank

apparatus, as well as the recent records of Trendelenburg and myself, show that here we are not dealing with a pure sine curve. The curves show an irregular course; the first wave was usually decidedly shorter than the following ones, and only later in its course did the curve taper off into a few slow oscillations which were all alike. The deep fundamental tone was thus recognizable as the percussion note died away, while the initial oscillations obviously are due to quicker, shorter i. e. higher tones. Dr. Fahr has attempted an analysis of the normal lung note by means of curves made with the condenser microphone and oscillograph. He is able to determine that they represent a combination of two wave systems. One of these has a vibration frequency of 120, and the other is still higher. However, thus far we have an insufficient number of curves and analyses to draw any final conclusions. At any rate, it is at least certain that the lung note contains a deep fundamental tone. The practised ear of the experienced physician does not evaluate the sound of the normal and pathologic lung according to the fundamental tone. The higher overtones as well are certainly quite significant to him; and it will be our task to include these in our consideration and analysis.

Methods. As is well known, the use of percussion did not become general so long as it was practised according to Auenbrugger's method of direct percussion of the chest wall "*inter se adductis et in rectum extensis digitis.*" Not until after Piorry had introduced the pleximeter did it become the common property of the medical profession. It seems immaterial whether the finger or a pleximeter be used to percuss upon. The slight characteristic note of the pleximeter or the finger is inevitable. One need but recognize it and accustom himself to it. It is only important that the pleximeter or the finger press firmly and with constant force upon the surface that is being percussed. If a man raises the pleximeter finger a bit when approaching an area of suspected dullness, so that he is not pressing with the two distal phalanges, but rather with only the tip of the terminal phalanx, do not trust his percussion; he is cheating, and what is more, he is deceiving himself. Percussion must be performed in similar areas with absolutely equivalent blows. We must not explore the chest by percussing our ideas into it; we must rather give our attention to listening to what comes out. (*Man darf nichts hineinperkutieren, sondern nur heraushoeren*). The principal task in the course in percussion is to encourage the beginner in an honest method of investigation, and to guard him against the intrusion of previously formed judgments.

The question as to whether the hammer percussion which was introduced by Wintrich or simple finger percussion is to be preferred cannot be answered *a priori*. I have an impression that in the percussion of the abdominal organs, namely the liver and spleen, the difference is better perceived by use of the hammer, but that slight differences in the lung note and the cardiac dullness are better perceived by means of simple finger percussion. My experience may well signify that the high pitched tones of the tympanitic abdominal note are more clearly elicited through the more vigorous blows of a small, light hammer. On the other hand, if we employ a large rubber hammer such as is often used to elicit the tendon reflexes, and use a rubber eraser for example, (which has practically no characteristic note of its own), for a pleximeter, we are able to elicit clearly the deepest fundamental tones in percussing the lungs. However, it is almost impossible to determine the cardiac dullness in this manner, because these hammers do not elicit the higher tones which, as has been shown above, are of especial importance in the recognition of the relative dullness. The heavy rubber hammers remain in contact with the ribs for a longer time, and cause them to vibrate to a great extent. Thus, far too large an area is vibrating, and the higher tones are suppressed and damped.

A light hammer, on the other hand, with a relatively small rubber tip, whether like that of Wintrich or Curschmann, sets up vibrations in a smaller area, and makes perceptible the diagnostically important higher overtones. The fact that one cannot use finger percussion to bring out the high pitched overtones or the characteristic metallic ring, but must use a bone or metal pleximeter with a hard rod (the pleximeter-rod percussion of Heubner or the *signe du sou* of the French) is evidence that the manner of striking and the kind of instrument used are not immaterial factors. It may be left to individual preference whether finger percussion or hammer and pleximeter is preferable for ordinary use, but the choice is not only dependent upon one's individual ability to hear, but also upon the peculiarities of his fingers. Hard, bony fingers are better adapted to the purpose than soft, fleshy ones, because the latter have the same disadvantages as the above mentioned thick rubber hammer and the rubber eraser pleximeter.

The more recent conclusions in regard to auscultation, voice sounds, and vocal resonance will be discussed in a forthcoming paper.

THE MEANING OF PSYCHOANALYSIS*

BY MARTIN W. PECK, M.D.†

THE word psychoanalysis, in the thirty years of its existence, has come to have a place in the vocabulary of all educated people, and is not unknown to the man in the street. Unfortunately, such a wide variety of meanings and allusions have developed for the term, that it bids fair to become "all things to all men," and have its real significance obscured. For clear thinking on the subject, some more precise consideration of definitions seems desirable.

Psychoanalysis has three distinct meanings: First, it designates a special system or school of psychology. Second, it refers to a unique and distinctive method of treatment for nervous disorders. Third, it covers an equally distinctive method for research study of the human mind, normal or abnormal.

Historically, the therapeutic side came first. In 1895, Breuer and Freud published their *Studies in Hysteria*. They found that certain hysterical symptoms were removed by bringing to consciousness forgotten experiences which bore a causal relationship. These experiences had occurred in childhood, were "traumatic" in intensity and character, and usually sexual in nature. The investigators believed that the forgetting was purposeful, brought about in order to protect the individual from the painful memories of the experience and the term *repression* was selected to designate the mechanism. They considered that the symptoms of the patient were disguised expressions of these repressed memories, which had remained as "foreign bodies" in the deeper recesses of the mind. Hypnotism was used at first as a means for bringing hidden memories to the light, and this process, together with a frank facing of the early experience in conversation with the physician, plus a discharge of painful emotion (termed "catharsis") was called psychoanalysis. As the method was perfected, hypnotism was found to be unnecessary and the process of free association was substituted. It is not the purpose of this paper to review the history of psychoanalysis. Suffice it to say that this first conception was altogether too simple for a general explanation of neurotic symptoms, and marked only a first step in the development of the present psychoanalytic doctrine.

PSYCHOANALYSIS AS A SYSTEM OF PSYCHOLOGY

It is not literally correct to speak of psychoanalysis as a system of psychology. Rather does it consist of a body of material, empirically established from observed clinical phenomena, arising in therapeutic procedure. Interpretation of these facts has led to the psychoanalytic hypotheses, which are still fragmentary and somewhat unrelated. Freud himself has deliberately refrained from forming a school of psychology, and has devoted his attention to the development of special topics or lines of thought to which his clinical observations and his reflections have led him. There is nowhere in the literature a systematic presentation of psychoanalytic psychology. An exception may be Rank's *Genetic Psychology*, of recent publication, in which the author, using the material of psychoanalysis, constructs a psychologic system which has not proved wholly acceptable to the more rigid Freudians. Rank's work is brilliant in conception and gives a welcome unity to parts until now disconnected. Time will be needed to determine the proper place of this contribution in the development of psychoanalysis.

In comparison with older schools of psychology, psychoanalysis contains new material and makes radical departures from other viewpoints. This matter may be summarized as follows:

(a.) Psychoanalysis deals chiefly with the "unconscious" mental life, maintaining that the more important mental activity goes on outside the subjects awareness.

(b.) It establishes *repression* as a central psychologic mechanism, meaning by repression a purposeful omission or elimination of mental material from consciousness. In normal states this mechanism disposes of what is unnecessary and inconvenient for consciousness. In abnormal states it takes care of what is intolerable and insolvable by consciousness. The difference between healthy and pathologic repression is chiefly one of degree. Healthy repression is a mechanism for efficient management of childish and asocial qualities which are common to all. Pathologic repression comes into play under special need, and is used to evade tendencies which are so potent and in such crude contrast to anything acceptable by consciousness that they cannot be disposed of by more constructive means. In both cases the material repressed remains in the unconscious. In the former it is integrated into the structure of the mental organization and is compatible with health. In the latter it remains unassimilated, is a source of inner mental disharmony, and is often the basis of neurosis and other maladjustment.

(c.) Psychoanalysis recognizes unconscious mental conflict as a source of psychic difficulty. Conscious mental conflict is apparent to all. The conception that such conflict may go on completely outside the conscious grasp of the individual is distinctive to psychoanalysis.

(d.) There is a new emphasis on infantile and child psychology, again stressing the unconscious features. Appropriate psychologic

*The substance of lectures given to Harvard Medical students at the Psychopathic Hospital, March, 1928, as part of a third year elective course in Psychiatry.

†For record and address of author see "This Week's Issue," page 847.

development at this early period is felt to establish patterns of reaction which insure satisfactory adult adjustments. On the other hand, failure in the solution of some basic developmental problems may result in their being carried over to adulthood, as a sort of unfinished business of the past, which complicates all later mental reactions.

In so far as psychoanalytic psychology is a system, it is a psychology of the instincts, or rather the instinctive basis of mental processes, and thereby accepts a biological foundation. Freud postulates two groups of instincts: the sexual or procreative, and the ego, or self-preservative. In a sense, these two groups are set in opposition, the sexual instincts striving for independent outlet, the ego instincts molding them to appropriate and useful social expression. Freud's earlier work dealt mainly with the first group. This is made up of a wide variety of factors, but all are reducible, according to him, to a common denominator which, in the wider sense, is sexual in nature. Psychoanalysis has an energy concept of psychology analogous in a way to the energy concept of physics, and, continuing the parallel, most of the energy manifestations of the psyche are derivatives from one common source, the procreative or sexual energy, designated the *libido*. In accordance with this concept, the so-called libido theory of Freud was developed as a central theme around which the elaborate structure of psychoanalysis has been built up.

Stripped to bare bones and given in merest outline, Freudian psychology, normal and abnormal, is explained by the libido development and its vicissitudes. Undifferentiated at birth, the libido goes through an orderly course of evolution from the simple organization of the child to the complex organization of the adult. This libido development manifests itself on two planes; development in relation to *aim*, and development in relation to *object*. Aim development is concerned with the physical organism itself, and with the libidinal investment of various bodily systems. At birth the libido is diffusely and somewhat homogeneously attached to all body orifices, special senses, skin and musculature, which together are designated as infantile erogenous zones. From then until the age of four years, or thereabouts, a reorganization takes place in the nature of differentiation and specialization, until the libido investment is drained away from other organs and concentrated chiefly in the genitals. There is then later established, so far as aim is concerned, a harmonious organic whole, manifested in the so-called primacy of the genital zone, with subordinate co-ördination of the other erogenous zones. The aim organization of the libido is illustrated objectively in the adult by the act of coitus. In this consummation of the love relation, the genital goal is supported by other preliminary physical contacts,—kissing, caressing, looking, and so on.

For various reasons, orderly development of the libido in relation to aim does not always occur. *Fixation* may take place at various levels of development, and a too intense libido investment may remain permanently at some of the preliminary stages. There is then discord rather than order among the libido elements and a unified aim organization is prevented, leaving the individual variously handicapped in the working out of his love life. In the sexual field proper of adulthood, these over-invested partial impulses may come to the surface in full flower with imperative demand, and be the basis of sexual perversions. In a less crude and simple way are also explained such sexual abnormalities as impotence and frigidity. On the purely psychic side, where difficulty from similar libido disturbance more commonly shows itself, there may develop neurotic symptoms and other maladjustments. In this connection Freud has referred to the neuroses as the "negative of the perversions."

It must be kept in mind, if one wishes to grasp clearly Freud's thought, that sex as he uses the term means something more and different than is usually understood. The ordinary person thinks of sex in terms of behavior, to be indulged, desired, or abhorred. Freud, in contrast, has in mind more often the psychologic préparedness for behavior and attitude, i. e., the subject's inner state of libido development. In other words, the ordinary person thinks of sexuality as physical phenomena, while Freud deals with it chiefly as mental phenomena. There is reason to believe that a different choice of terminology might have avoided some unnecessary confusion.

The theory of libido development in relation to object is less schematically simple than that with reference to aim. The brief presentation which follows requires an over-simplication which can hardly be conducive to conviction. It is hoped, however, that it may supply a basis for the later discussion of therapy. The mother, as dispenser of food and protection, is the first object of emotional interest on the part of the child, which interest Freud conceives as a libido manifestation. The necessary thwarting and rebuffs in training throw the child back on himself and for a period the libido is engaged in a self love, called "narcissism." The autoerotic habits of early childhood, thumb sucking, genital handling, and so on are physical manifestations of this narcissistically directed libido. Next, a homosexual stage is entered into, during which the individual loves those "like himself;" and later a heterosexual level is attained, externalized first at puberty, when the central current of love interest turns toward the opposite sex as a preliminary attitude to later mating.

The much discussed *oedipus situation* belongs

in the field of object relations.* The child enters this phase of his development at about the same time as the primacy of the genital zone is established, e. g., the fourth year. The oedipus situation has been designated the nuclear complex of the neuroses, and by the same token may be considered the nuclear complex of health. Simply presented, these statements imply that the way the child solves his early libido relationships with the parents, determines his fitness or unfitness for meeting later in life other human relationships and the world of reality in general. The oedipus situation may be conceived as the original triangular love relationship, made up of child and parents, most of the drama, be it emphasized once more, going on in the unconscious of young Oedipus,—a subjective triangle rather than an objective one. Here is experienced the earliest apprenticeship in actual emotional adjustments, and the degree of its success or failure marks a good start or a poor one toward all later human relations.

Using the boy for illustration, the little egotist wishes to monopolize his mother for a love object. Immediately he finds himself in a critical dilemma. He must renounce his need for exclusive monopolization of the mother or find himself in competition with the father. If he holds to his first purpose, he must both wrong the father by usurping his rights and hate him as a rival. From these attitudes spring guilt and fear. The normal child solves this intolerable problem by a constructive renunciation which emancipates him from the oedipus situation and permits him to strive on toward new goals. Others, unable to renounce, are forced to some unsatisfactory and compromise solution, which results in an imperfect orientation of their libidinal makeup, adequate, perhaps, for the remainder of childhood, but insufficient to give them the necessary freedom for adolescent and adult adjustments. More technically speaking, libido fixation may occur at any stage of object relation in a manner akin to those in relation to libido aim, and form in a similar way the basis for later perversion or neurosis.

To those unfamiliar with the data of psychoanalytic findings, the theory of libido development with its implication of infantile sexuality sounds like the flimsiest vagaries of fancy. It still further strains credulity to find that all these extraordinary proceedings of the libido go on outside of consciousness, and that little has been directly observed in the behavior of children to substantiate these hypotheses, which are formulated, instead, as a reconstruction of the past from the study of the mental life of neurotic adults. However, theorizing is no new procedure in the progress of knowledge, and demands no justification in itself. Psychoanalytic study of the human mind brings forth seemingly unequivocal data completely overlooked by former methods of investigation. Psychoanalytic theories have been established in order to give working concepts for the interpretation and understanding of these findings. There is no reason to believe that these theories are complete or final. In fact, except in a few fundamentals there has been continuous change and development since the beginning. Substitute theories that will explain facts as well, and be as useful in understanding and therapy, are always in order. The nature of the subject matter makes difficult or impossible the experimental confirmation demanded by strict scientific method. It may well be that many of the problems of mental life must always remain in the realm of philosophy rather than of science.

Psychoanalysis as a system of psychology has an important bearing on many of the biological and social sciences. However, the main medical interest is, of course, in the application of its theory and practice to the problem of the neuroses. Nervous illness is explained by Freud in accordance with the libido theory. For a person to adjust to life harmoniously, and live at peace with himself and the world, an appropriate socialization of his instincts is essential. In psychoanalytic terminology, psychological health requires that the ego shall be in control of the libido. "A person only falls ill of a neurosis when the ego loses its capacity to deal in some way with the libido." (Freud; Introductory Lectures, p. 323.)

It is to be noted that Freud's neglect of the organic side in psychology and psychopathology is not due to repudiation of its theoretical existence. He states: "We must recollect that all our provisional ideas in psychology will some day be based on an organic substratum. This makes it probable that special substance and special chemical processes control the operation of sexuality and provide for the continuation of the individual life in that of the species. We take this probability into account when we substitute special forces in the mind for special chemical substances." (Collected Papers, Vol. 4, p. 36.) At the present stage of scientific knowledge, however, Freud agrees with other members of the so-called "functional" school that to bring in a hypothetical organic physiology and pathology to explain mental processes complicates theory and retards progress, with little return in the way of compensatory gain.

Various schools of psychoanalytic thought have developed, notably those of Jung and Adler, which diverge markedly in some respects from the distinctly Freudian principles. But the roots of all these systems have a common origin in the work of Freud. Whatever may be the special merits of these particular contributions, it stands to reason that, as Steckel happily puts the matter in metaphor, "A pigmy on the shoulders of a giant may be able to see farther than the giant himself." In the last few years there has been evidenced new interest in

*So called from the Greek legend of King Oedipus, who, moved by forces of which he had no knowledge or control, slew his father and married his mother.

"ego-psychology," so called in distinction to the libido psychology chiefly emphasized by Freud. Rank and Alexander are the leading exponents of this line of thought at least so far as the problem of neurosis is concerned, although here, as elsewhere, Freud has blazed the way. Briefly, ego-psychology emphasizes that part of the human personality which represses, in distinction to that which is repressed. In contrast to the libidinal instinctive trends which still remain the dynamic source of mental activity, the social and ethical forces of inhibition, modification and control are given more consideration. In some of this new doctrine, sexuality in the sense of the libido theory assumes a new relative position. It is looked upon more as manifestation than as cause, perhaps the most important and central phase of human psychology, and certainly a standard of measurement for psychological health or illness. In the light of these views, Freud's axiom that "with a normal sex life there can be no neurosis," might be changed to *a normal sex life is an index which marks the absence of a neurosis.*

PSYCHOANALYSIS AS A METHOD OF TREATMENT

This subject will be discussed from the standpoint of principles and of technique of therapy. The fundamental principle of procedure in psychoanalysis is to take the patient back to the source of his unsolved mental conflicts, activate the factors once again, and aid in a new and better solution. This backward journey is carried out simultaneously in two ways. First, intellectually, by means of a reconstruction of the past through memory; and second, emotionally, by the actual experience of the analysis itself. The first means referred to is more important so far as the research side of mental study is concerned, but the second has a much greater significance in therapy.

The intellectual reconstruction of the past includes a searching autobiographical review of the whole life history. Often no material not already available to the patient is brought to light. In other cases, notably the hysterical group, the horizon of recollection is markedly extended, and many wholly forgotten incidents and attitudes appear, reaching back to very early childhood. In either case, the whole matter of life experiences and influences are newly evaluated. In addition to the conscious autobiographical study, it appears possible, by inference and indirection, to get at much of the unconscious mental past which is wholly inaccessible to ordinary means of investigation. This material includes in particular the oedipus situation and the various patterns of reaction laid down in childhood by the family relationships in general, anomalies of which form the basis of the psychoneuroses.

The emotional experience of the analysis, the second means for reaching the source of old and unsolved conflicts, will be treated under the topic of *transference.*

The technique of psychoanalytic therapy is characterized by five features: (1) The physician maintains a passive rôle; (2) the emotional relation between patient and physician called *transference* is put to systematic and special use; (3) a type of thinking called *free association* is taught the subject and used as the main method by which he reveals the deeper content of his mind; (4) a distinctive and important use is made of dreams; (5) little attention is paid to the special symptoms which bring the patient for treatment. In contrast, consideration is given to the patient's personality as a whole, and study is directed toward the basic mental organization where lie the real difficulties of which the symptoms are merely the surface expression.

Each of these five features can well be considered in turn. It should be kept in mind that in both the outline and discussion, statements are over-simplified for clearness and need to be interpreted somewhat relatively.

(1) *Passive Rôle*

The part played by the analyst is quite in contrast to that of the guide, philosopher and friend of traditional psychotherapy. He in no way intrudes into the external life and circumstances of the subject. He gives no advice and neither criticizes nor condones, praises nor blames. The analyst's personal affairs, his tastes, views and philosophy of life are kept strictly in the background. His work is limited solely to assisting the patient in an interpretation of his own thoughts and feelings which arise during the course of the analytical hour. The physical arrangements in the office support the passive rôle of the analyst. The patient usually lies on a couch, the analyst being seated behind and out of sight. Social relations are kept at a minimum. There is no casual conversation on matters outside the analysis. At the end of a long course of treatment with all its intimacy, a subject often knows less of the personal life of the physician than he might of a new acquaintance after a brief chat. The whole procedure bears little of the nature of a discussion. It is much more a monologue by the subject, who talks of whatever comes to mind; in other words, the subject thinks out loud. The analyst may offer interpretations from time to time, or he may remain silent for the whole hour. Periods of complete silence may intervene, when the patient has no articulate thoughts, or is reluctant to talk. The analyst is unconcerned and can wait. The subject does the work. He carries out a personality study of himself. It is impossible for him to do this alone, and the analyst is there to assist. There is little of the teacher-student relation. Rather, the situation consists of two people studying a single problem—the mind of one of them, and they are interested only in one thing, the truth of that mind which

lies behind the ordinary disguise of every-day life.

(2) *Transference*

In all successful psychotherapy, as, in fact, in most medical treatment, a very special emotional relationship exists between physician and patient, which is known as *rapport*. This rapport is by no means confined to medicine, but exists in all close relations, such as may occur between teacher and pupil, leader and follower. Without it, none of these relationships are deeply significant. When rapport is present in psychotherapy, immense power is given to the physician,—sufficiently so that patients are helped or cured quite independent of special method. From the beginning of the healing art, this power has been used to relieve symptoms, to inspire courage, to support renunciations and to aid in bearing burdens. Much of the time effects have been gained without the physician being aware of the power he was wielding. The blindness to the meaning of rapport on the part of the medical profession has been nothing short of extraordinary. The force which it represents has been better grasped by the quack healer who knows that by it he can influence people quite regardless of the worth of his professed agency of cure. Certain medical men have seen fit to disparage the rapport feature in therapy as unscientific and savoring of chicanery; others appear to fear it as dangerous; and still others exalt some special method of treatment, quite oblivious to the existence of the rapport element which gives it life. If it were necessary to choose between method and rapport in psychotherapy, there is little question but what the latter would be the more useful agency.

If psychoanalysis had done nothing more in a practical way than to make its contribution to the subject of rapport, designated by Freud, *transference*, it would have well justified itself. The attempt has been made by psychoanalysis to study and standardize these important and powerful phenomena of transference, to harness them, so to speak, and make them available in a systematic and controlled way for psychotherapy. To be sure, no one knows what rapport consists of. No wonder the scientific world is shy! There is magic and mystery in it. Its absence leaves words of logic and wisdom fruitless and sterile. Its presence may make these same words potent for influence. Personality with a capital P is the word popularly applied to the special mysterious something in the physician which makes possible the easy establishment of rapport. Accompanying this term is often the implication of the dynamic, authoritative and dominant person who is always the leader in any field of activity. In the transference situation of analysis, it has been shown that no special type of personality is essential to gain rapport. The quiet, less assertive individual seems as well able to play the part as his more robust-minded brother. Apparently what the neurotic person longs for is understanding, and when he finds it in a professional relationship, a satisfactory rapport can be easily enough established, either with or without the sense of leaning on a master mind.

In much of the usual psychotherapy, a permanent relation tends to be established. The patient orients his life around the physician, and looks to him for inspiration and guidance. The rapport connection remains a permanent one, even if direct contact is rare. Janet refers to the physician's part in this relation as "directorship". We all know people who are directed in such a way by a physician or someone in another capacity. This is often a necessary and perfectly good arrangement, but it is not the method of psychoanalysis. In psychoanalysis the power of rapport is employed in a different and special way. It is not used for guiding the patient or immediately to affect his symptoms. It is directed toward enabling him to carry out a study of his own mental life.

The first step in this process is to bring to the surface trains of thought ordinarily automatically repressed, and which bear strong and painful affect. Special timidities, fears, disloyalties, aversions, and so on, jealously guarded by the neurotic even from himself in real life, are given immense relief by this ventilation. The patient, so sensitive toward criticism or disapproval, is comforted by finding in the physician one who accepts without appraisal and shows equal interest and tolerance for the strong features and the weak, the good and the bad. The patient learns that, after all, he may not be so different from other people. His inferiority is lightened; he feels hope, and his attitude toward the analysis is that at last he has found what he has been looking for—someone to understand him. This long sought-for goal he thoroughly believes to consist in recovery from his illness. As a matter of fact, it is much more a justification without conflict of his present level of adjustment for which he strives, and the knotty problem in therapy is to substitute for this latter palliative procedure a more constructive reorganization of function. In any case, this preliminary stage binds the subject still more firmly in the analytic situation.

As a second step, he begins to experience rather than remember his past, i.e. certain parts of the past become reanimated and he lives them over again. With this what Freud chooses to call a "transference neurosis" develops, which means that for the time being the subject shifts some of his conflicts and difficulties from the problems of the past and of his usual world to the analytic relationship. The matter of the transference situation in analysis is difficult to describe, but not so difficult to experience either as subject or as analyst. Freud speaks of the "general tendency of human beings to transfer," meaning that all men have a need for

understanding, sympathy, support and so on, which is never wholly fulfilled in ordinary human relationships, with the result that there is a constant reaching out for more complete satisfaction. This universal need and longing furnishes, no doubt, a foundation for much of the religious tendency of mankind. Whatever the case may be with normal individuals, it is plain that the neurotic tends strongly to transfer. He brings into all his contacts with people childish and undeveloped emotional needs and strivings carried over from the past, and which are doomed to be thwarted and violated in a normal adult world. Even if these needs, egocentric as they are, were in themselves capable of satisfaction, the fact that he must deal with other people, each with his or her own special demands, and perhaps no better prepared than the patient himself, spells continually disappointment. Furthermore, these arrested emotional trends of the neurotic are by their very nature conflicting and incompatible. There is lacking the unity and integration of the normal personality. What satisfies one part, violates another, and he is forced to a continual state of repression, inhibition, control, and compromise. This conflict of demand may be illustrated by the not unfamiliar type of neurotic who longs to find in all his contacts with those in authority the image of the protective father upon whom he can lean. Actually in such relationships his own independence and manliness rise in protest at the subjugation which he creates for himself, and on the surface his final attitude may be more of defiance than dependence. The neurotic is for the most part unaware of these conflicting inner trends. He only knows that he feels isolated in a world of people and suffers from symptoms and dissatisfaction.

The analytical situation developing during the analysis is to a certain extent artificially constructed to make it possible to bring up into the open these undeveloped, inadequate and conflicting needs in a way that cannot be accomplished elsewhere. The analysis is a one-sided relationship, in marked contrast to those of the real world of daily living, or, for that matter, of the ordinary professional relationship. This one-sidedness permits the subject to set aside the usual social veneer of his mental life, and to come, for the time being, nearer to the real self underlying the every-day official personality. Freed from the necessity for artifice and control, he repeats the past in phantasies and attitudes in the analysis. Instead of recalling old patterns of reaction, he re-lives them during the analytic sessions. From this experience, a patient, suitably selected, is enabled to see himself as he really is,—to realize the inadequacy of his emotional preparation for adult living and to grasp the impossibility of satisfying some of his demands. By means of this combination of experiencing and understanding, he is able to revise in terms of adulthood some of his infantile strivings and to dismiss in the light of adult knowledge his crushing internal verdicts on crimes of infantile imagination. The analysis gives him the opportunity for something of a laboratory sampling of his whole life plan, expressed in words instead of action, and quite free and apart from the need of maintaining responsibility and control, which, in ordinary living, he dare not relax. The analyst acts in this laboratory setting less as an individual than as a composite phantom figure of the childhood past, in its family setting, and toward this figure are reactivated all the main relationships which have played a formative part in the patient's life.

Not all of this is seen as clearly as outlined above, either by subject or analyst. Part of it appears distinctly in conscious awareness, and in actual emotional reactions directed toward the analyst. Much of it goes on beneath the surface and is only grasped by indirection through dreams and so on. In other words, the transference relation exists both consciously and unconsciously, and like other relations of real life, at times the two attitudes are in accord and at times diametrically opposed. The ambivalent and ununified emotional life of the neurotic is revealed in transference with its positive and negative features. On the one side are need, dependence, and a reaching out; on the other are withdrawal, hostility, and resentment. One side or the other only may be seen on the surface, but the opposite is usually active on deeper levels. Over and over in this analytic experience patients re-live and thereby reveal important parent-child or other early relationships, left unsolved, buried in the unconscious, and carried over to adulthood, to condition all later reactions with people. Thus is accomplished by a controlled experiment in actually living what would defy an understanding by objective study and intellectual approach.

Part of the analyst's training is to be emotionally untouched himself by this transference relation. Otherwise it becomes a human problem for the patient, like any other, and the deeper revelation sought for is defeated. The analyst must be as immune to criticism, hostility, and even insult, on the one hand, as to deification or adoration on the other. In analysis, all these attitudes are reflections of deeper complex motives and sources which the analyst patiently and steadfastly seeks to uncover. He recognizes full well that it is less as an individual than as a symbol and substitute that he is functioning. He is permitting himself, as it were, to be used as a foil, in order that the patient may thereby get in deeper touch with his own mental life. The analyst's passivity and refusal to enter into any reality relationships, even to the extent of a friendly argument, enable the patient to arrive at a convincing emotional realization of the persistent infantile tendencies responsible for his neurosis.

It is not so difficult to establish a transference. If the patient continues the treatment, he does that of his own accord. To do away with the transference is a more difficult but equally important procedure. The analysis is not complete until the patient has freed himself from the transference situation, that is, until he has given up the analyst as an object of very special significance in his own emotional life. In a sense, it may be said that the goal of the analysis is to teach the patient to live with the analyst on an adult rather than on an infantile plane. This accomplished he can go back to the ordinary world of men better prepared to carry on the same level of relationship.

(3) *Free Association.*

Free association is a method of thinking in marked distinction to that ordinarily carried on, even in the most idle phantasy or day-dreaming. In ordinary thinking there is a constant automatic tendency to eliminate the unpleasant or difficult. This is not always possible, so that often enough painful lines of thought take possession of the mind. Frequently this reaches obsessional intensity, and a train of futile and unpleasant thinking repeats itself indefinitely. In free association, the subject is encouraged to permit his mind to be passive and undirected, and in this state to put into words as well as he can the thoughts, pictures and feelings that drift through. It is emphasized that everything belongs in the analysis, no matter how disconnected, irrelevant, trivial, personal, or unpleasant. This procedure, of course, requires the complete co-öperation of the patient and the ability to acquire competence differs markedly. Most subjects can gain a sufficient degree of proficiency to make the method a practical one. In the familiar word-association tests, Jung has attempted to standardize the free association method. This special application has found a useful place in experimental psychology, although at present less often employed in ordinary clinical procedure.

Criticism has been offered that free association in analysis is not free, but is determined by special conditions, including the personality of the analyst. This criticism is no doubt sound, but free or not, the method described enables the individual to go deep into his own mind. The term "free association" remains, if one pleases, as a convenient misnomer to designate a special process. It is found that wherever the starting point may be, free association progresses finally toward the fundamental problems of the maladjusted person, which, as a rule, lie far too deep to be available by any direct approach. The routes of free association are circuitous, with wide detours and frequent retracement of steps, but always, if persisted in, they lead in the direction of the problems sought.

Without some experience in free association, one is unaware of the lack of freedom in the usual thinking, to say nothing of talking. As an illustration may be used the attitude of an individual toward a friend, even if the occasion for such an analysis is difficult to be imagined. The conscious attitude is one of interest, affection and loyalty, but this is the final integration of many elements which go to make up a whole. Some of these elements are likely quite at variance with the final common path of friendship. Jealousies, malice, distrust and resentment may have a place, though not important enough to offset the stronger and more desirable feelings. Ordinary thinking tries to dismiss and eliminate these discordant notes. Free association tends to bring them up to the surface.

A natural question arises as to why there should be any attempt to unearth underlying partial and discarded components of mental attitudes. The answer is that no reason exists save one, viz: that such disharmonious trends are the cause of neurotic or other difficulty, and in such case there is a good chance that they can be handled better if made conscious and in the open than if left buried alive in the depths of the mind. That the inevitable goal of free associative thinking should be some phase of the most important life problems seems clear enough. Certainly it is true with the more obvious problems of external life. If a man had recently suffered financial disaster and was asked to be quite passive mentally and to think of the North Pole, or some other neutral matter, it would not be long in his associations before his misfortunes came to mind. Perhaps it is only a difference in degree from what is seen when the thoughts of a neurotic, wherever they start, drift toward some manifestation of the repressed, unconscious, unsolved psychic aftermath of infantile conflict, which are his real problems of to-day. It proves to be a fact that thoughts in free association, however disconnected and unimportant they may seem to be, are joined together by threads of connection located in the unconscious mind, and which give bias and direction. By this method sooner or later deeper layers of mental functioning are progressively revealed.

(4) *The Use of Dreams.*

The subject of the meaning of dreams and their use in psychoanalytic therapy, can be little more than summarized in this paper. According to Freudian theory, dreams are a more direct expression of the unconscious mental life than are any other psychic phenomena. This expression is in disguised and symbolic form, both for the purpose of condensing material and of protecting the dreamer from conscious recognition of certain repressed mental processes set free in the dream. Based on this relationship of dreams and the unconscious, they prove to offer a more direct access to the deeper levels than do other manifestations of a subject's mental life. They may be used in two ways, either as a starting point for the free associative method of

thought, or by direct interpretation of the dream, to reveal the unconscious mental states behind it. Interpretation of dreams is a somewhat risky procedure, in that it is hard to draw a fast line between sound fact and specious fancy. It is no doubt true that there are many levels for meanings of dreams, and that they can best be interpreted by taking into account their relation to the whole problem which is being studied. Certain types of dreams and simple standard symbolization are possibly exceptions to this rule, and the significance of such dreams is fairly generally accepted except where the Freudian dream theory is repudiated altogether. Free association in relation to dream elements appears to give the method the advantage of a short cut in analytical procedure. As a rule, neurotic patients have dreams, but occasionally there is an exception. In such event, the analysis has to go on without this advantageous material. This usually offers something of a handicap, but in no way prohibits a successful aualysis. At the present day the use of dreams for diagnostic and therapeutic purposes is by no means confined to psychoanalysis, and is emphasized in some degree by modern psychiatry in general.

(5) *Management of Symptoms.*

Naturally, the patient's mind is at first full of his own symptoms and problems. Analysis, to a considerable extent, must ignore them. It has at its object something more and different than direct relief of symptoms, good as such treatment may be in certain cases. It is assumed, of course, that analysts employ common sense as well as special method and there may be exceptions to the rule. It is taken for granted, also, that before the analysis was undertaken, organic basis for physical symptoms was eliminated by competent medical study, and that there is no crisis in the external circumstances of the patient's life which cannot wait for settlement until the analysis is over.

Usually the lack of comment on the part of the analyst leads the patient to drift away from the subject of symptoms. It seems that for the most part it takes two to keep a topic going. If nothing else comes to the patient's mind, his annoyance, perplexity or grievance at the analyst's attitude, is made manifest and a new line of thought is started. Occasionally symptoms are so intrusive and monopolize the mind so completely that they cannot be ignored. If these are physical symptoms, the patient is referred to a medical colleague. If the need is for advice in matters of daily life, some other outsider can best be turned to. It is well that both have some sympathetic viewpoint toward the analysis. With the responsibility of these matters shifted to others, the analysis can then proceed. Its one interest in current conflict and problem are as they offer material for analysis.

The following example will illustrate both the matter of free association and the management of distressing symptoms which obstruct analysis: A young man had been under analysis for a severe anxiety neurosis. Among his symptoms was a fear that pieces of food or glass would become lodged in his throat. This phobia led to all sorts of food prohibitions and the necessity for repeated daily reassurance from family and physicians. On principle, the analyst declined to give special attention to these symptoms, leaving the patient quite free to turn to his former sources of support. In spite of this arrangement, these symptoms so filled his mind that no other material was available. Hour after hour he manoeuvered to get the analyst to take the rôle of authority and to reassure him. His distress was no less acute on account of complete insight into the lack of basis for his fear and a realization that the analysis was being obstructed. One interview was discontinued, and at the analyst's suggestion the patient went rather shamefacedly to consult a laryngologist. During this examination he was able to see the humor of having his throat looked into for something he knew quite well was not there. At the next hour of analysis, the patient discouragedly announced, after a period of silence, that all he could think of was that a peanut was stuck in his throat. He was asked to let his mind be passive and to continue to think of his throat. Immediately a scene from his childhood was recalled. He had entered his parents' bedroom when both of them were scantily clad; his father reproved him sharply, and the boy felt anger and resentment. This long forgotten scene coming to mind in such association caused the young man astonishment. The throat symptom was lost sight of for the time and he talked of other events of his boyhood. The relation between the throat phobia and the family emotional drama of childhood illustrated by this bedroom scene later became clear enough—during this interview some thread of connection joined the two topics in free association. To the objection that this connection had been suggested by the analyst, it can only be stated that with as fair consideration as could be given, such did not appear to be the case.

RESISTANCE

In dealing with a nervous illness, one is faced with the strange and paradoxical fact that the patient clings to his neurosis as though he did not wish to get well. He suffers, often enough he complains bitterly, and he is unhappy. He sacrifices time and money for treatment. He longs for health and freedom, and protests his willingness to make every effort, yet unmistakably he defends himself adroitly against therapeutic influence, and holds to his symptoms as though they were something precious. This instinctive opposition to medical aid is called *resistance* by psychoanalysts. The novice in psychotherapy is apt to be much annoyed by the

phenomenon of resistance. The patient does not want to be helped? Very well—tell him in no uncertain terms what you think of him, and give up the case.

More careful consideration of the nature of nervous disorders makes less puzzling the resistance which is set up against therapeutic attempts. A neurotic illness is no accident. It marks the failure to stand up before the demands of life as the direct consequence of inadequate psychological preparedness. The normal man has worked out the best plan of mental organization that he can in order to avoid pain and achieve satisfaction. For the most part he knows and cares little about this inner mental life. The whole thing operates with as little relation to consciousness as does the digestion of a healthy boy. But somewhere the normal man has a useful scheme of values, emotional needs capable of satisfaction in a grownup world, and some sort of philosophy of life which keeps him in tune with the universe.

After all, in general policy, the neurotic has done no differently from other men. He, too, has constructed his scheme of life to avoid pain and achieve satisfaction. The fact that this scheme has broken down makes it no less his own, the best under all the circumstances that he could do for himself, and it seems to him the lesser of two evils when compared with any alternative. Consciously he recognizes his difficulties and is ready to change. Unconsciously, he holds with might and main to the status quo. To be asked to let down repressions which have been built up so painstakingly to hold an undeveloped emotional life in control, strikes panic to his soul. It seems to him far safer to hold to the evils that he has than to fly to those he knows not of.

Something like what is described above is, in a general way, the main theme in resistance. Many other secondary factors enter in. For example, there is the so called "gain from illness," where symptoms appear to gratify impulse needs substitutively even though at the same time they cause distress in other ways. Also the transference situation itself produces a special and stubborn resistance in the nature of an attempt to find in this new relationship a comfortable and protected existence, which is threatened by recovery. At times the resistance is so unyielding that there is little chance of breaking through. This is true in paranoid states and the major hypochondriases and, in lesser degree, applies to some obsessional neuroses. In other cases, the gain from illness is too practical and obvious to be lightly set aside. This is evident in that type of neurotic who, by his symptoms, has acquired special privilege and freedom from obligation. Appropriately chosen cases for analysis must be those less rigidly organized than the paranoid and with more robust qualities of personality than the one who is a neurotic for special privilege. With these the central point of the analytic art is to break down resistances. Resistances rather than "complexes" are what the analysis is ever seeking to discover. In just so far as these can be removed, is it possible to get at and modify the underlying psychic states from which spring the roots of the neurosis.

Resistance, therefore, is always present in analysis. If none is evident, then beware! It is operating under some new and unrecognized disguise. Neurotics, like other people, are very much alike, and there are many standard manifestations of resistance. Some of the more familiar are exaggerated criticism and skepticism of the analysis based on something other than the merits or demerits of the case. Plain boredom at the tediousness of the process is not uncommon. As already noted, physical symptoms may intrude themselves so forcefully into the patient's mind that there is no room for other material. Depression or anxiety may reach such intensity that no analysis is possible till some relief is forthcoming. Often the patient ingeniously attempts to intellectualize the analysis, to lift it to the level of objective discussion; or he tries to turn the tables and analyze the analyst. Again, he may suddenly cease dreaming, or on the other hand bring such a confusion of dreams that the very mass of them defies analytic consideration. One adroit bit of super-resistance is rapid recovery. The patient feels quite well again. He is interested and appreciative of the analysis, he will recommend it to his friends,—but there is no need of continuing in his own case. Selective amnesias of all sorts occur:—material or interpretations of special significance are repeatedly forgotten in a way difficult to credit without actual experience. The use of wit to avoid direct issues is not unfamilar. In the matter of free association, resistance may show itself by complete inability on the one hand or, on the other, by endless and footless rambling in self-indulgent phantasy.

Resistance brings analytic procedure to repeated states of deadlock. Occasionally there is no passing by, and the analysis must be discontinued. More often, with a suitable patient, the analyst is able to point out resistance, and if this explanation is in any way accepted, the deadlock relaxes and the analysis proceeds, the patient falling back, as it were, to still other positions of resistance, where the same process of overcoming must be repeated. At times the analyst, from his experience and in his detached position, sees these points of resistance clearly, at others he, like the patient, is groping forward for a period in the dark.

PROCESS OF ANALYSIS

During the treatment hours, the patient, so far as is possible, gives up self-direction of thought, lets his mind drift, and by means of speech empties its content, so to speak, into the

analysis. The analyst listens to this material, subjects it to the test of his own trained mind, objectively related to the problem, and attempts to determine what motives and elements lie behind. The patient complains that the analyst ignores the obvious, is suspicious of everything, and seeks deep and hidden meanings. The charge is true—in the neurotic, things are not what they seem, and it is the business of analysis to question everything. At times meanings are clear, very often they are obscure. Positive interpretation, when things are plain, and a questioning attitude when they are obscure, seem to make it possible for the patient to shed layer after layer of disguise, and come nearer and nearer to the real problems of his mental life. Even questioning and hypothesis proved later to be quite off the track apparently does no harm, and in a properly conducted analysis the patient himself sifts the wheat from the chaff.

The detail of analytic technique is changing, and will change much more. Among other things, the single fact that most educated people are informed on psychoanalytic theory has made for revision of method. Formerly a memory reconstruction of life history and the revealing of formative mental mechanisms took first place. In this the causal features of the pathology were given first consideration. Now the emphasis is laid more on the analytic situation compounded of transference and resistance, i. e., the emotional experience rather than the intellectual one. The analysis furnishes, as it were, a small edition of the emotional life history of the subject, the inadequacies of which he learns through actual repetition. It is a truism that one cannot live his life a second time. In some respects, an analytic experience seems an exception to this rule. Certain poorly developed features of the emotional life are lived through a second time and thereby the subject is given another opportunity to do better with them.

A therapeutic analysis takes much time,—from a few months to a year of daily interviews is common. It is not difficult to see that the time element is important. The method is educational rather than inspirational or conversional, and education takes time. For practical reasons, however, everything that short-cuts analytical procedure without sacrifice of accomplishment must be welcomed, and steps have been made in that direction.

Diagnostic analysis is often relatively simple. In many cases, after a few interviews the analyst grasps some of the more general features of psychopathology involved. This is nothing strange. After all, the main fundamental themes of human life are few, and the general lines of difficulty are much the same. But what the physician knows or thinks helps the patient very little. Somewhat as in the case of music or the fine arts in general, so in the art of mental adjustments, what a second person knows is only of value in helping the other to gain by his own experience. The matter, however simple in theoretical formulation, cannot be imparted by word of mouth.

To sum up the significance of psychoanalytic treatment, it is the belief of its advocates that the patient is given a unique and carefully worked out opportunity to change from emotional dependence to emotional independence, and to grow from his state of childishness to one nearer adulthood. His personality is organized on an imperfect but rigidly crystallized basis. Analysis is an attempt to reach deep down, to loosen or liquefy this structure, and to make possible thereby a reorganization on a new and better level. Massive experience in real life occasionally accomplishes this same thing. A great love, some deep religious awakening, a sudden demand for duty and sacrifice, or a self-obliterating social movement, such as a "holy" war, may, as it were, lift an individual bodily from his own difficulties and leave him a changed man.

Obviously, the mass of neurotic and maladjusted people are not going to be cured by such accident of circumstance. Analysis is an attempt to accomplish by systematic, standardized, measurable procedure what cannot be well left to the uncertain fate of spontaneous growth.

ADDENDA

Questions which naturally arise concerning psychoanalysis are—for what type of patients is it suitable, and what is its relation to other methods of psychotherapy? Psychoanalytic treatment of the technical nature described applies only to a selected group of cases which is limited in various ways. A considerable degree of intelligence is essential. On the whole, after the first half of life, the method is not advisable. The circumstances of the patient's life must be such as to give him opportunity to gain satisfaction in normal living. Such things as hopeless poverty, failure in ambition, severe bereavement, or an unhappy but binding marriage bond may be insurmountable obstacles. Such people will profit more from methods of consolation than of reconstruction. Most psychoanalytic work has been with neurotics, and little is known as yet of its influence on psychotic patients. Psychoneurotics, to be helped by psychoanalysis, must have considerable fundamental stamina of personality. Nothing is added to a man by this method, and he is given no crutches to lean on. He can profit only as he has promise of better things within himself. The obsessional neurotics, conversion hysterias, certain sexual abnormalities and the common anxiety states offer the most favorable material for treatment by analysis.

Psychoanalysis has been called the major surgery of psychotherapy. The comparison does well enough. Like major surgery, analysis does not help everything, nor is it usually the first method to be thought of in the case of trouble. Most nervous difficulties can be helped by more

simple methods. Perhaps one may say that analysis, like surgery, should be reserved for those problems which less radical procedure does not reach. The time and money involved make psychoanalysis a therapeutic luxury. As is the case with private sanitaria, trips around the world and so on, it must necessarily be beyond the means of the majority of people. Certainly the vast numbers of psychoneurotics in both clinics and private practice will have to get along without it. Other psychotherapeutic methods—suggestive, persuasion, common-sense teaching, directorship, and so on—will remain the main resources in psychotherapy. It is true, however, that psychoanalytic doctrine has influenced all methods of modern psychotherapy. Perhaps the therapy of choice for the future will be some eclectic procedure borrowing from all sources and enriched in depth by the analytic school. In prophylactic measures through general education, psychoanalysis can certainly add much to the self-understanding of the individual, which the complexity of the modern world makes desirable.

In conclusion, a word of consolation and encouragement may not be amiss for the "tough minded" and scientifically conditioned individuals, provided any such have read thus far. The physician trained in objective scientific method often finds much of psychoanalysis highly perplexing and irritating. It is his custom to require clear-cut observation as a basis for conclusion, to deal cautiously with hypothesis, and to remain uneasy in mind until it is checked by experiment. In psychoanalysis he finds its hypotheses verified chiefly by its own findings, and see much that is unverifiable. Such elusive doctrine as the matter of transference leaves him cold with disgust or hot with annoyance. Men of this mind need not concern themselves unduly. There is an easy and dignified way out of all the trouble. One may sweepingly deny that there is any such thing as nervous or mental difficulty which is not the effect of some physical pathology towards which a rational therapy must be directed. As an alternative, it may be maintained that nervous or mental symptoms shall only be dealt with on the descriptive level, and that there is no possibility of getting behind them for motive or meaning. The disinterested and skeptical will find themselves in distinguished company in either of these positions. This company includes neurologists and psychiatrists as well as those more remote in their contact with the subject and there will be no need for defence or apology in these attitudes. However, the trend of modern thought favors psychogenesis in nervous disorders, and the organist finds himself more and more in the reactionary group. It may well be that another generation will swing back again to a different viewpoint. Philosophically, at any rate, there must be a unity between body and mind. But for all practical purposes there is a division of the affairs of man into physical and mental, and this, whether he be sick or well. After a century of research, little has been gained from a study of the physical basis for disorders of mental functioning present in the neuroses. The approach to the subject on the theory of psychogenesis, of which psychoanalysis is the most important development, seems to promise far more in the way of understanding and therapy.

ETHER DAY AT THE MASSACHUSETTS GENERAL HOSPITAL

DR. F. H. McMECHAN, Editor-Secretary General, Associated Anesthetists of the United States and Canada gave a very interesting account of the history of anesthesia and outlined the work of Dr. William T. G. Morton in his speech given at the presentation of the bronze bust of Dr. Morton to the hospital.* Mr. William Endicott accepted the gift with appropriate remarks.

At the conclusion of these ceremonies adjournment to the auditorium in the Moseley Building followed. There the address of Dr. Graham Lusk was delivered. This latter meeting was called to order by Mr. Endicott, who presented Dr. Elliott P. Joslin. Dr. Joslin introduced Dr. Graham Lusk the speaker of the day with the following remarks:

INTRODUCTORY REMARKS TO THE PAPER BY PROFESSOR LUSK

BY ELLIOTT P. JOSLIN, M.D.†

THERE is a hill in Worcester County, which I love. Around it I rode my pony as a boy; upon its summit I saw my father work for pleasure at the age of 77, restored to life by the present Senior Surgeon of the Massachusetts General Hospital. To its North lies Worcester, always noted for its diversified industries, the result of ingenious and inventive minds; to its South is Webster, where lived Samuel Slater, the Father of American Manufactures, Founder of American Cotton Manufacturing; a little West of North is the site of Clara Barton's home, the Founder of the Red Cross and a little East of South the old fort built by the Huguenots. But when I look into the full blaze of the summer's setting sun I see the Charlton hills—the birthplace of William T. G. Morton, our hero of today.

Reared in such surroundings it is no wonder that Morton became an inventor, a philanthropist, a pioneer in action and in thought—the fine product of his environment.

From early morning to late evening those Charlton hills remind me of Morton and also of the other eminent men I have known whose lives were a part of this institution—Reginald Heber Fitz, John Homans, Charles B. Porter, John Collins Warren, Maurice Richardson, John W. Elliott, Francis B. Harrington and Samuel J. Mixter—all worthy successors to the Bigelows, Shattucks, Jacksons and Warrens. What a genealogy this old hospital has! And it is most fitting that the speaker of today who will interpret to us the past and predict the future is also of noble lineage.

Graham Lusk, the son of William Thompson Lusk, the obstetrician of his time and a Professor in New York, and Mary Hartwell Chittenden —whose father was the donor of the Chittenden Library at Yale—took to heart our Dr. Holmes' advice and with discrimination chose for his descendants May Tiffany as his wife and for his medical ancestry, as his scientific son, Eugene DuBois, has recorded, Carl Voit of Munich, pupil of Liebig, pupil of Gay-Lussac, pupil of Berthollet and Laplace, pupils of Lavoisier—and contemporaries of the Paris teachers of James Jackson and John C. Warren.

The inspiration which Jackson and Warren brought back to Boston has been flowing since in the veins of the doctors of this hospital and of Graham Lusk. We recognize in him our distinguished cousin with the blue blood of the best in science coursing through his veins.

Graham Lusk, Professor of Physiology at Yale, at University and Bellevue, at Cornell, from the start has been a laboratory doctor and about the first of the genus in America. He has never been a practising physician. And yet you ask him here to address practitioners of medicine. But I venture that when you have heard what he has to say, you will agree with me that no family doctor could have struck a more humanitarian or tender note and quite as refined as the C. P. Chemicals upon his laboratory shelves. Graham Lusk is a professor of physiology, but he has harnessed chemistry and physics to draw him to his goal—the solution of the processes of life. His aim has been to analyze the changing activities of your body and mine as a chemist might study the components of an unknown solution. His powers of critical analysis have grown to be so acute that he has been called to solve medical problems and with so much success that in New York City today he has become the acknowledged leader of medical thought and their most respected and beloved doctor—a family doctor to New York City.

I feel the honor deeply, Mr. Endicott, of being allowed to introduce to you and to this audience Professor Graham Lusk—a laboratory professor who has protruded new and lofty standards into American Medicine, this analyst of the components and functions of the human body, this gentleman who is an humanitarian for the many, but for the individual a stimulating teacher and a friend.

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†For record and address of author see "This Week's Issue," page 847.

ON DIABETES

Ether Day Address of 1928

BY GRAHAM LUSK, PH.D.*

THE unveiling of the bust of Morton is a just and proper tribute to one in whose hands surgical anesthesia became a reality. The last phrase is that of Dr. John Collins Warren, of the Massachusetts General Hospital, who himself performed the historic operation with Morton as the anesthetist, in which a tumor was removed from a patient who remained under ether anesthesia during the entire surgical procedure. To the eminent men of Boston and to the Massachusetts General Hospital the world owes what Weir Mitchell called the "Death of Pain."

It is well to cherish the past. A Briton once said that he did not regard a man as fully educated unless he had seen Egypt, Greece, Rome, representing the three great civilizations of the past, and Palestine, where we got our religion. An American remarked that it was hard for those in his country to meet such requirements and received the reply, "Perhaps it is unnecessary in your country, you have no past, you have only a future." Possibly we as a people do have too small a sense of reverence for past achievements, so this celebration of Ether Day in Boston appears to have a very special significance in showing that sometimes we also may acclaim the workers of days gone by.

It may be permitted to recall that in my own field of physiology Henry Pickering Bowditch was its leader in the earliest days, that William Townsend Porter, beginning in 1898, edited and published the *American Journal of Physiology*, the first strictly scientific publication related to American medicine, and that Walter B. Cannon, taking up the work of William Beaumont, which had been published at Plattsburg, New York, in 1833, has continued it almost from the point at which Beaumont left it and has extended our knowledge of the movements of the gastro-intestinal tract so that advances in this subject may be said to be almost exclusively American.

Dr. Means has suggested that diabetes may be the subject of this address. I am reminded of the question put to Joseph Jefferson inquiring why he always played Rip Van Winkle. The reply was, "If I play anything else, they say that Jefferson is falling off." It requires some temerity, nevertheless, to speak in Boston on the subject of diabetes because Boston is the home of a great master of this disease. I can only say that I have often told my students that if I myself had diabetes I would place myself under Joslin's care.

F. H. Garrison has written: "It is right and proper, however, that anatomy, physiology and pathology should be given separate places in public libraries, apart from medicine, as these basic disciplines are also correlated with general biology and its branches, with primitive plastic imagery and with the fine arts in general."

I may be prejudiced, but in a way it seems to me that the scientific work upon diabetes has some of the attributes of the fine arts.

I have in mind no formal talk but one partly of reminiscences. When I entered the laboratory of Carl Voit in 1888 the master said to me, "A diabetic patient in spite of an adequate diet always loses flesh. I believe this is due to a higher protein metabolism when sugar is not oxidized. If you will establish yourself in *nitrogen equilibrium* when taking a mixed diet of meat, fat, and carbohydrate, and then drop the carbohydrate, I believe that the nitrogen outgo from your body will exceed the nitrogen intake, thereby proving that you, like the diabetic, lose flesh from your body simply because carbohydrates are not being oxidized." And the experiment proved that this forecast was true.

This suggestion antedated the discovery of von Mering and Minkowski that removal of the pancreas produced complete diabetes in dogs. Complete diabetes in the diabetic means three things:

1. Glucose cannot be oxidized.
2. Because glucose which arises from protein metabolism cannot be oxidized, the destruction of body protein is far greater than it is in the healthy individual.
3. Because glucose cannot be oxidized B-hydroxybutyric acid, an end product of fat metabolism, is not properly oxidized, and, in man, cases are on record which indicate that this final fragment of fatty acid metabolism may not be oxidized at all.

The complete diabetic oxidizes no sugar, converts nearly 60 per cent. of his protein into sugar, and loses 20 per cent. of the total energy content of his fat metabolism through his inability to destroy the acetone bodies which are the end products of the oxidation of the fatty chains. The accumulation of these acids threatens him with coma and death, though for the most part they at first find a path of elimination through the kidney, as does the sugar also.

A classical example of this state of affairs is pictured by Magnus-Levy on the basis of a diabetic and comatose boy, as follows:

METABOLISM OF A DIABETIC BOY

		Calories
Protein, 90 gm.	(369 cals.)	
Fat, 200 gm.	(1909 cals.)	2278
Deduct 97.5 gm. *B*-hydroxybutyric acid	(443 cals.)	
50 gm. urinary glucose	(185 cals.)	628
	Utilizable calories	1650

*For record and address of author see "This Week's Issue," page 847.

Here we observe that 28 per cent. of the total energy of the diet is lost in the urine through the nonoxidation (1) of glucose derived from protein and (2) of B-hydroxybutyric acid derived from the incomplete oxidation of fat.

When Magnus-Levy published this calculation in 1908 his statement that 50 grams of glucose could arise from 90 grams of protein was at once challenged, for Minkowski had shown that only 45 grams arose from 100 grams of protein metabolized by diabetic dogs. Magnus-Levy countered this accusation by stating that he had taken the higher value from American work.

Minkowski's experiments showed that in completely depancreatized dogs, when they are fasting or fed with meat, 2.8 grams of urinary sugar appear to one gram of urinary nitrogen. Since one gram of urinary nitrogen corresponds approximately to a destruction of 6.25 grams of protein, it follows that $\left\{\frac{2.8}{6.25} = 45\right\}$, 45 per cent. of glucose (dextrose) arises from the metabolism of protein. None of this sugar comes from fat, for the urinary sugar rises and falls in strict proportion to the intensity of the protein metabolism and is uninfluenced by fat ingestion or by increasing fat metabolism whether by muscular exercise, or by the influence of cold.

Minkowski's Dextrose : Nitrogen or D : N ratio was therefore 2.8:1. In 1898 American experimenters found that if phlorhizin were administered to dogs a constant D : N ratio, represented by 3.65 grams of urinary glucose to one gram of urinary nitrogen, could be obtained day after day in the fasting state or when a diet of meat or of meat and fat was administered to the animal. Other domestic animals—rabbits, cats, goats—treated with phlorhizin gave the Minkowski ratio of 2.8. Only the dog showed the higher ratio of 3.65. This indicated $\left\{\frac{3.65}{6.25} = 58\right\}$ that 58 per cent. of the protein molecule was convertible into glucose.

The value of this discovery was enhanced by the finding of the same ratio in a diabetic man. The patient was the president of his class at the New York University and Bellevue Hospital Medical College and was a nephew of an American admiral celebrated in the Spanish-American war. When this patient received a diet strictly free from carbohydrate his urinary D:N ratios on three successive days were 3.60, 3.65, 3.66, values comparable to those in the dog made diabetic with phlorhizin. This work was submitted to the *American Journal of the Medical Sciences* for publication and was declined by that journal. For this reason it was published in the *Deutsches Archiv für klinische Medizin* after acceptance by its editor, Friedrich von Müller.

This high D : N ratio in human diabetes has been confirmed by many others in diabetic patients who receive diets containing meat and fat but free from carbohydrate.

Many years ago Joslin told me that this diet of high protein and fat was unjustifiable, that it was wrong to give it to any patient. To test this point the workers of the Russell Sage Institute of Pathology in 1917 gave a high protein-fat diet to a potential diabetic whose urine had been free from sugar when receiving a diet containing 40 grams of sugar. The result was that this man became completely diabetic, manifesting a D : N ratio of 3.8 on the second day of the diet. Upon administering the Allen fasting treatment sugar disappeared from the urine within two or three days, and a degree of tolerance for carbohydrate was restored.

Wilder, Boothby, and Beeler have carried the matter still farther. A diabetic patient, when given a diet high in protein and fat, manifested D : N ratios on successive days of 3.41, 3.76, 3.98, 3.78, an average of 3.73 for four days. Twenty grams of acetone bodies were eliminated in the urine of the final day and the patient became drowsy with impending coma. A Newburgh diet of low protein, low carbohydrate and high fat was then administered, with the result that urine of the patient on the seventh day of this diet became free from sugar and free from acetone bodies. A repetition of the high protein-fat diet reproduced a second time the classical symptoms of complete diabetes.

The Newburgh diet was planned so that it was low in protein and that it contained one molecule of available glucose to two molecules of fatty acid. With this mixture to oxidize in

D:N RATIOS

Phlorhizin		Diabetes Mellitus in Man						
In dog	In man							
Lusk	S. R. Benedict	Mandel and Lusk	Greenwald	Foster	Mosenthal	Joslin	Wilder, Boothby and Beeler	
3.60	3.58	3.60	3.75	3.58	3.75	3.69	3.41	3.39
3.65	3.82	3.65	3.56	3.38	3.85	3.67	3.76	3.68
3.66	3.66	3.66	3.70	....	3.44	3.67	3.98	3.62
3.62	....	....	....	....	....	....	3.78	3.84
3.63	3.68	3.64	3.66	3.48	3.66	3.68	3.73	3.63

the body the patient was restored to health.

It is a truly remarkable fact that the daily administration of 100 grams of protein in the form of meat may convert a potential diabetic into one who is completely diabetic and who may pass into coma through such treatment.

Stanley Benedict at one time administered phlorhizin to a patient with cancer, having in mind the removal of the nutrient sugar. The patient was given a diet of meat and fat and his D:N ratios on three successive days were 3.58, 3.82, and 3.66. On the last day 37 grams of B-hydroxybutyric acid were eliminated. All of these factors are characteristic of complete diabetes in the human being.

It appears astonishing that the administration of phlorhizin to a man not diabetic will produce results which are entirely comparable to the administration of a high protein diet to a potential diabetic.

Because we know enough today to give a Newburgh (or Petrén) diet to a diabetic patient does not absolve us from knowing the fundamental background of the picture. There is much to indicate that there is normally a production of 58 grams of glucose in the body when 100 grams of protein are metabolized. But this is not visualized except from the information gained from complete diabetes. It is obvious that these results which have been obtained in our day and generation are not fit material for repetition. The important thing to realize is that they are facts, and facts which ought not to be forgotten. One question still arises, would insulin cure this high protein diabetes?

The great majority of diabetic patients do well when given a Newburgh, or what is the same thing a Petrén diet, low in protein, high in fat, with just enough carbohydrate to enable the chemical end products of carbohydrate to unite with those of fat so that the cylinders of the human machine do not "smoke" with incomplete products of combustion, such as B-hydroxybutric acid. Thus Woodyatt graphically expresses it.

The question may occur to some of you to ask concerning the dogma of the conversion of fat into sugar in the diabetic. May not the urinary sugar of the diabetic receiving a strict diet of meat and fat rise out of all proportion to the protein metabolism and higher D:N ratios than 3.65 be obtained? Such results have indeed been reported in the German literature, 10 grams of sugar being found in the urine to one of nitrogen, which would mean the origin of 10 grams of sugar from the metabolism of 6.25 grams of protein, an obvious impossibility. The presence of this excess of sugar has led to the deduction that sugar must arise from fat. Greenwald reported a similar case in this country regarding a diabetic girl who lived in a hospital room with another girl. When the two were separated and strict watch was kept the D:N ratio of the diabetic fell from 10 to 3.65. The truth is that the average complete diabetic is a carbohydrate thief. One other illustration will suffice. DuBois had placed a diabetic patient under strict supervision. One day the patient's sister called and the nurse left the two together for one minute. Later, suspecting mischief, it was discovered that the patient had four sandwiches in his bed, two of which were sequestered in his arm pits! It is my firm belief that upon such episodes depends this flimsy variety of "proof" that fat is converted into sugar in metabolism. The complete diabetic is usually not to be trusted in the presence of bread and to all intents and purposes must be kept in a metabolism cage if reliable results are to be obtained.

Just as Boston gave the use of ether to suffering humanity, so Toronto has given insulin to the severe diabetic. The story of the discovery of insulin has a romantic flavor. Banting, a struggling young clinician in a provincial town in Canada, gave up his practice, sold his furniture, and partook himself to Macleod's laboratory at Toronto, having the definite aim of discovering the pancreatic hormone curative of diabetes. In association with Best, a second year medical student, he prepared pancreatic extracts which were effective in curing human diabetes. Collip later joined the group and devised a method by which, for the first time, the potent hormone could with certainty always be extracted from the pancreas.

So startling was this discovery that many were unconvinced. An assistant in Minkowski's clinic told me that Naunyn, a celebrated authority on diabetes, wrote to Minkowski and told him he was not to believe a word of it, that it was another case of American "bluff."

And Banting, with the first prize money awarded him for his discovery, purchased a portrait by Romney which had long haunted him. Who will deny that physiology and the fine arts are not related?

Just as in the case of the use of ether to produce anesthesia, so priority claims of various individuals as regards the discovery of insulin may be found in the literature. I can only recite to you an incident at a meeting of a medical society in Germany at which a certain proponent of his own claims addressed the audience. When the speech was finished the great Minkowski arose and remarked, "I, too, share with my colleague the regret that I did *not* discover insulin."

A picture of a diabetic boy, dying in coma, restored to health by the use of insulin is only one illustration of this precious gift to humanity. Insulin enables the body to oxidize sugar and therefore destroys diabetic acidosis; and it enables the deposition of glycogen in the liver. The oxidation of sugar limits the destruction of body protein. With all the great literature which has appeared upon the subject these are the fundamental facts.

The work of Hill and Meyerhof has shown that muscular activity is carried on at the expense of a reversible glycogen—lactic acid—glycogen reaction. Curiously enough, although the liver cannot hold glycogen in diabetes, the muscle is singularly resistant to such loss. In consequence of this the diabetic muscle may still be functionally active. Indeed, as Fischer and Lackey have pointed out, the glycogen content of heart muscle may be much higher in the depancreatized than in the normal dog. This is another of Meltzer's "factors of safety," or a potential ability for the physiological protection of the body in greater measure than the immediate necessity demands.

Since the discovery of insulin it has been a matter of comparative ease to prepare patients for operation. Wilder and his associates report from the Mayo Clinic that there were 20 deaths in 667 operations upon diabetics, and that none of the deaths was attributable to the disease. Nellis B. Foster points out that in normal persons ether anesthesia increases the blood sugar and increases the acid in the blood and that in diabetes ether administration increases the blood sugar and accentuates the acidosis. The preparation of the patient for operation may be either through administration of a Newburgh diet or, if time does not allow this, through administration of insulin in increasing doses, observing of course, the blood sugar, blood carbon dioxide, and urine sugar. The oxidation of the sugar will destroy the acids in the blood and the power to hold carbon dioxide will increase.

Joslin devotes many pages of his classical book on diabetes to this subject of the preparation of diabetic patients for operation, and he, with Lahey has recently spoken upon diabetes and thyroidism with an authority which I do not possess. It is only one side of the fundamental physiological background which I have felt at all competent to portray.

MELANOMA (MELANOTIC SARCOMA) OF THE OVARY WITH DIFFUSE DISCOLORATION OF THE SKIN

BY JAMES RAGLAN MILLER, M.D., F.A.C.S.*

THE case reported in this paper exhibited a pigmented ovarian neoplasm belonging to a small group of tumors which though seldom seen is the center of much scientific interest and investigation. Is it possible that a pigment-bearing tumor can develop primarily in tissue which normally does not contain such pigment? Although the present case report cannot materially aid to solve this fundamental question and lacks some of the detailed study which would be desirable, it is presented in order to record another instance of a rare tumor and to report the accompanying diffuse pigmentation of the skin. No such instance of diffuse discoloration could be found in a thorough search of the literature.

LITERATURE

All authors agree that the tumor reported by Amman[1] was a primary ovarian melanoma in the sense that it originated within the ovary. It did not, however, originate in true ovarian tissue, for it had its inception in a dermoid cyst, which may readily contain pigmentiferous epithelial structures of various kinds.

Many of the ovarian tumors reported in the literature are clearly metastatic from a primary tumor in a pigmented mole, naevus or the choroid. Other cases are not so easy to explain, so that in the absence of any such demonstrable primary tumor authors have ventured to assert that their cases are of primary ovarian growth. This view was taken by Winternitz[2], whose article also presents an excellent review of the literature up to 1909. He felt that his case was the fourth instance to be reported of a pigmented tumor occurring in tissue which is normally devoid of pigment. The first on record he considered to be Treve's tumor of the ileum, the second Duval's tumor of the common bile duct and the third Andrews' tumor of the ovary.

In the absence of a well-marked primary lesion elsewhere in the body, Winternitz would consider as secondary, tumors which are encapsulated and show considerable uniformity of growth both microscopically and in the gross. Conversely, well-marked lobulation of a tumor with invasive growth and a great diversity of appearance in the gross and microscopic picture he would regard as indicative of a primary growth.

Soubeyran and Rives[3] reported a case which, according to the above criteria, they believe to be primary. They list as primary ovarian tumors: Andrews 1901[4], Westenhoeffer 1902[5], Amman 1903[1], Bab 1906[6], and Winternitz 1909[2].

Westenhoeffer's case, however, had bilateral tumors with membranous capsules and the author suggested the pigment-bearing corpus luteum cells as forerunners of tumor pigment cells, and explanation which cannot be considered seriously.

Dawson[7] reported a metastatic melanoma in the ovaries, skin and other parts of the body fourteen years after sarcoma of the choroid had been removed. It is clear, therefore, that no case can be considered as primary in the ovary unless autopsy has definitely excluded all of the commonly known seats of primary melanoma.

Andrews' case is not so easily dismissed. It had all the appearances of an ovarian growth, though examination of the adrenal glands was not reported. It is interesting to note that the case reported by Bab was also reported by Magelsdorf[8]. The former argued for a primary ovarian tumor, while the latter considered as the primary source a telangiectatic naevus of the popliteal space. This naevus had existed for a year and there were metastases along the long saphenous vein.

Basso[9], in 1908, considered the literature to contain six secondary and only one primary tumor, i. e. Amman's case. He reports another secondary tumor originating in a pigmented mole. His summary of the literature showed that Virchow, Ribbert, Borst, Lubarsch and Larasso denied the possibility of primary pigment tumors existing in non-pigment-bearing tissue. Borst collected 48 cases of melanoma of the female genitalia of which 36 involved the external organs and 12 the internal organs. Of the latter eight were tumors of the uterus and four of the ovary.

Nowak[1], in 1920, reported what appeared to be a primary melanoma of the right ovary, but at autopsy there was found a general sarcomotosis and a primary growth in the choroid. He believes that none of the reports in the literature of primary ovarian melanoma are free from criticism. Nowak gives a table showing the different staining reactions of the various pigments, including malaria pigment, haematoidin, haemosiderin, lipofuscin and melanin. He describes melanin as insoluble in acids and alkalies but soluble in the ordinary fat solvents and declares that it forms very fine crystalline needles or granules of the brown color. It can be bleached by the ordinary bleaching solutions, does not react to tests for iron, gives no basic reaction with Nile blue and neutral red and gives no stain with Sudan III or Scarlet R. According to Ciacco no reaction is obtained by the methods of Fischler, Smith-Dietrich or by the Weigert marrow stain. It gives a silver nitrate reaction

*For record and address of author see "This Week's Issue," page 847.

but is stained by osmic acid only on repeated exposure.

The best review of this entire subject is to be found in Ewing's "Neoplastic Diseases", third edition, 1928. He defines melanoma as "a pigmented tumor arising from a specific mesoblastic cell, the chromatophore; probably also from tactile cells lying in the epidermis and probably also from nerve cells in the derma."

Ewing recognizes as common sources of melanomata pigmented moles and naevi, the choroid, iris and ciliary body, the pia arachnoid, adrenals and colon. Among the disputed points of origin of melanoma he lists the gall bladder, liver and spleen, but does not mention the ovary. Ewing summarizes the histogenesis as follows:

(1) Exclusively from mesoblastic chromatophores (Ribbert).
(2) Exclusively from epithelial cells and epithelial chromatophores (Post, Wieting and Hamdi, Favera).
(3) From nevus cells in the skin, and mesoblastic chromatophores in choroid and meninges.
(4) From endothelial cells of blood- and lymph-vessels, or of nerve-trunks.
(5) From chromatophores, tactile corpuscles, and nerve-cells forming the end-apparatus of the cutaneous sensory nerves (Masson).

Ewing mentions numerous instances in the literature of adrenal melanoma. These tumors occur usually in adults, are of moderate size and usually produce extensive metastases with no evidence of primary sources in the skin or choroid. Ewing mentions the "dopa" reaction of B. Bloch. Though the significance of this reaction is not yet known, it is thought that the dioxyphenylalanin darkens the chromatophores, demonstrating melanogen a forerunner of melanin. The presence of iron is variable and melanin may be dissolved by strong alkalies and bleached by hydrogen peroxide, chlorine and by Whitefield's method (potassium permanganate 10% for several hours followed by dilute sulphurous acid). A deep reddish violet color appears on addition of sodium nitroprusside with potassium hydroxide, which changes to blue on acidification.

Melanin is often reported in the urine, which may be passed free from color turning black on exposure to the air. It is thought that its excretion is in the form of melanogen, which is oxidized to melanin. This excretion may be hastened by administration of potassium iodide without causing any toxic symptoms.

CASE REPORT

H. H. No. 136776. Our patient was an unmarried white woman of 21 years, first admitted to the Hartford Hospital on October 27, 1921.

Chief complaint "intestinal trouble" for one year, growing abdominal tumor for five months, progressive loss of weight and intense discoloration of the skin for several months.

Family History—Unimportant.

Past History. Menses began at twelve years, were regular every twenty-eight days, lasting seven days with considerable pain. The last regular period was nine months before admission at the time of her first operation, but there had been a slight show of blood four months previously. Her best weight was 135 pounds (61.4 kg.) one year before admission.

One year ago she began to have a sharp gnawing pain in the epigastrium which localized in the umbilicus. There was marked constipation without blood in the stools, but the latter were often of a tar color. Two months after onset of these symptoms blood was noted in the stool; three months after onset she was suddenly taken with a sharp pain in the right lower quadrant and she began to bleed from the vagina. This continued for three days with constant vomiting and she was taken to the New Britain General Hospital. Dr. E. J. Fromen operated on Jan. 19, 1921, removing the appendix and resecting 45 cm of ileum because of intussusception. She left the hospital four weeks later and felt well for about twenty days, when she was again seized with severe abdominal pain and vomiting. Dr. Fromen again operated on March 6, 1921 and found an acute obstruction at the ileo-caecal valve. He resected 125 cm of ileum and made an end-to-side anastomosis. On personal communication with Dr. Fromen I learned that he observed no pigmented areas in the ileum at either operation, nor did he find anything which appeared to have a direct connection with the patient's present illness. No examination of the tissue was made. She left the hospital feeling fairly well though she continued to have a poor appetite and steadily lost weight.

Present Illness. Six months before admission patient began to vomit each morning.

The vomiting was preceded by nausea and was not projectile; she had a constant and severe diarrhoea up to ten stools daily, without discoloration. Five months before admission she began to notice a tumor in the abdomen, at first on the left of the midline. This caused no pain and was not tender. During the succeeding months she noticed some difficulty in voiding a concentrated reddish brown cloudy urine. She occasionally had chills and fever lasting as long as ten hours and recurring about every two weeks. There have also been profuse night sweats. A loss of weight has continued progressively until at present she weighs eighty pounds (36.3 kg). During the last five to seven months she has noticed a steadily increasing bluish color of the skin over the entire body. There have been no symptoms referable to the respiratory or cardiovascular systems.

Physical Examination. Patient was found to be a well developed, poorly nourished, very ill looking young woman with a most striking slate blue to gray discoloration of the skin, most marked about the face, back and in the abdominal scars. There was no dyspnoea, cyanosis or jaundice; no petecheal hemorrhages or brown pigmentations of the skin were noted, nor was there any increase in color of the ears, nose or extremities. Sclerae and buccal epithelium showed a similar discoloration. Examination of the chest was not abnormal except for slight prolongation of the breath sounds.

The abdomen was disfigured by two deep blue colored scars one in the lower midline and the other in the lower quadrant. The upper abdomen moved freely with respiration, but the lower part bulged with a tumor mass which extended from the symphysis to one inch (2.5 cm) above the umbilicus. This mass was rounded and not unlike a pregnant uterus of six months' duration except that the lower part of the tumor flared out at the pelvic brim and the whole mass was immovable. The liver and

spleen were not palpable and no free fluid could be demonstrated.

Vaginal examination was not possible but by rectum a normal sized uterus was felt lying parallel to Poupart's ligament pushed forward and to the left by the tumor. The entire pelvis was filled with an irregular, semi-solid mass continuous with the abdominal tumor. Its consistency was that of a soft fibroid. The tumor was not tender and it was clearly separated from the uterus.

Tentative Diagnosis. Malignant tumor of the right ovary, probably carcinoma.

Laboratory Report. The urine on October 27 was turbid, of reddish color and acid, specific gravity 1.016, slight trace of albumen, no sugar but many red blood cells. A few hyaline casts were noted on November 10th. On November 16th alkaptone was found in the urine and a dark precipitate was obtained with ferric chloride, which suggested the presence of a soluble melanin.

On November 16th spectroscopic study of the blood serum showed no met- or sulph-hemoglobin. Wassermann reaction was negative. Stools showed no blood, mucus or parasitic ova. Red blood cells 3,216,000; hemoglobin 75% (Dare); white blood cells 7,800; polymorphonuclear leukocytes 54%, lymphocytes 43%, large mononuclears 2%, eosinophiles 1%. Platelets were apparently somewhat decreased in number.

Gastro-intestinal X-ray study showed the entire colon to be spastic, with a continued area of spasm at the proximal end of the sigmoid.

Operation was performed on November 8th under ether anaesthesia, with a preoperative diagnosis of carcinoma of the right ovary, by Drs. J. R. Miller and G. N. Bell. A lower midline incision was made from umbilicus to symphysis, excising a portion of skin for diagnosis. The abdominal cavity contained approximately 700 cc of colorless fluid. There were many omental adhesions, particularly about the former intestinal anastomosis in the region of the cecum. A large lobulated tumor of the right ovary was encountered, which was bluish-black, and it was noted that on exposure to the air the color perceptibly deepened. This tumor was semi-solid, resilient and the right tube was stretched over its surface. The uterus was of normal size and pressed into the left inguinal region, as described before operation. The tumor itself was easily delivered except for dense adhesions at the lower pole in the pelvis where portions of the tumor wall broke off. The cardinal ligaments of the ovary were ligated and the tumor was removed without difficulty.

The anastomosis of ileum to cecum was found buried in adhesions and it was not disturbed. The liver surface was felt to be smooth; the liver contained no palpable nodules; both kidneys felt enlarged with distinct lobulated masses at the upper poles. Over the left kidney could be felt a distinct mass the size of a billiard ball. These tumors were taken to be metastases in the adrenal glands. The abdomen was closed without drainage and the patient left the table in good condition.

Pathologic Report by Dr. Henry C. Russ. Pathologic diagnosis:—melanosarcoma. The tumor measures 17 x 11½ x 10 cm and is composed of a series of lobules of various sizes, fused together at the center. Along one side of the tumor is a collapsed Fallopian tube. The tumor itself is enclosed by a thin sac-like wall which strips off easily and appears almost transparent. The tumor feels fluctuant to the touch and on incision a small amount of dark bloody fluid escapes. The center of the mass is filled with granular friable tissue, pigmented deep black. This pigmentation is quite uniform in intensity. A small piece of skin is also submitted for diagnosis. Microscopically, the tumor is found to have the structure of a very cellular neoplasm. There is a narrow strip of fibrous tissue at the periphery, but within this the tissue is composed almost entirely of cells. They lie packed closely together in large masses with only occasional fibrous strands to support them. The cells are of the undifferentiated, connective tissue type. They are small and for the most part round, though a few short, spindle-shaped forms can be made out. The nuclei are relatively large, almost filling the cell bodies. They are vesicular, with multiple, minute nucleoli. The nuclei stain rather unevenly and mitotic figures are abundant.

The tissue shows numerous irregular shaped areas of necrosis.

The neoplasm contains a large quantity of pigment. It is dark, brownish-black and granular. It is found chiefly within the bodies of tumor cells. It appears especially dense around the margins of the necrotic areas. In sections stained with ferrocyanide, no well-defined iron reaction is obtained with this pigment. Microscopic sections of the skin show no abnormal pigmentation.

Subsequent History. Following operation the patient made an uninterrupted recovery with the wound healing well and she was discharged from the hospital on November 24, 1921. She was again admitted on February 20, 1922. The interim history showed that there had been numerous chills with fever of 102°. She had been delirious for three days before admission, vomiting constantly, and complaining of pain in the right flank and back and often having headache. The bowels had been alternately loose and constipated. She had noticed an egg-sized lump in the abdominal wall. The skin had remained about the same color as before, but several pigmented moles of various sizes were easily seen on the abdomen. These moles, the patient said, had always been present but had not been noticed on her previous admission. The abdominal mass grew rapidly, the liver could be felt one inch (2.5 cm) below the costal margin and the pelvis became filled with tumor masses. The patient went rapidly down hill and succumbed on April 8, 1922. During her last stay in the hospital the urine contained large amounts of soluble melanin and the blood picture varied only by showing an increase in the large mononuclears up to 14%.

Autopsy by Dr. Chapman, house officer. "Pigmentation of the skin is noted over the entire body and darkly pigmented moles are observed scattered as follows:— (1) over the right lesser trochanter, (2) left foot (3) left groin (4) right lower quadrant (5) over the abdomen and chest.

"The abdomen contains a small amount of serous fluid and is completely filled with numerous tumor masses dark brown black in color. The end to side anastomosis is buried in adhesions but is found to be in good functioning condition. The heart and lungs, liver, pancreas and spleen are essentially normal and the gastro-intestinal tract is normal except for the anastomosis.

"Both kidneys are enlarged and contained numerous cysts which are not pigmented. The adrenals are completely replaced by tumor growths each about five cm in diameter and darkly pigmented but there is no invasion of the kidney tissue.

"Aside from discoloration the bladder, uterus and left tube are normal. The right tube and ovary are missing and the left ovary is greatly enlarged with deep black tumor masses which fill the entire pelvis and resemble those found in the adrenals. No metastases are found in the brain or skull, the middle ears and eyes are also free from tumor growth. Anatomic Diagnosis—Melanoscarcoma."

DISCUSSION

In spite of the brief autopsy report, which leaves much to be desired, one gains the impression that we are dealing with a secondary melanoma which may have originated in a pigmented mole. The growths found in the adrenal glands were not invasive and did not look like the primary tumors. Furthermore, they were bilateral. It must continue to be a matter of speculation whether or not the primary growth was present in the ileum, causing the original intussusception.

It is unfortunate that a more definite statement was not recorded at the time of first admission concerning pigmented moles. We had the patient's word, however, that the pigmented moles had always been present, although it is certain that they were much more prominent and more easily observed at the second admission. One is led to suspect that the constant presence of a supply of melanogen in the blood stream may have caused a deepening of the pigmentation of all moles.

CONCLUSIONS

There has been presented a case of melanoma involving the ovaries and adrenal glands which is thought to have been primary in a pigmented mole. This patient presented an unusual feature which has not been referred to heretofore in the literature, namely, a uniform discoloration of the skin of the entire body. It is thought that this was due to the presence of a soluble melanin in the blood stream, though the influence of involvement of the adrenal glands cannot be disregarded, especially as there was no record of blood pressure or blood sugar examinations.

I wish to express my indebtedness to Dr. Walter R. Steiner, on whose medical service this patient was admitted, and to Dr. Wilmar M. Allen, Pathologist of the Hartford Hospital, for many suggestions which they have given.

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VERMONT STATE MEDICAL SOCIETY

THE ANNUAL MEETING, BURLINGTON, OCTOBER 11 AND 12, 1928

Report of the Meeting of the House of Delegates

THE fixed session of the House of Delegates was called to order by President W. M. Johnstone at five o'clock in the afternoon of Thursday, October 11, 1928, in the lecture hall of the Medical College, University of Vermont.

PRESIDENT JOHNSTONE: The meeting will come to order and the Secretary will call the roll of delegates.

The Secretary called the Roll, and vacancies therein were filled, making the Roll of the House of Delegates as follows:

Bennington: L. H. Ross, D. J. Lane.
Chittenden: C. A. Ravey, A. L. Fogg, B. D. Adams, W. T. Rees, R. L. Maynard, H. A. Durfee, G. M. Sabin.
Franklin: C. G. Abell, F. L. Lawliss, E. A. Hyatt, Geo. Hyde.
Lamoille: W. M. Johnstone.
Northeastern: F. E. Farmer.
Rutland: J. E. O'Brien, J. E. Eastwood, H. G. Frost.
Washington: G. S. Bidwell, E. A. Stanley, L. A. Russlow.
Windham: J. H. Blodgett, A. C. Black, J. A. Stevenson.
Windsor: A. L. Patch, A. M. Cram, A. B. Chapman.

PRESIDENT JOHNSTONE: If there is no objection these new members will serve in place of those who should have been here. (No objection offered.)

PRESIDENT JOHNSTONE: We will have the report of the Secretary.

Dr. Ricker stated that the report was printed on page 9 of the Record and on page 617, Volume 199, of the NEW ENGLAND JOURNAL OF MEDICINE.

Moved that the report, as printed, be accepted. Motion seconded, and carried.

PRESIDENT JOHNSTONE: The report is accepted as printed.

Any reports of committees?

Dr. Ricker states that the reports of the various committees were printed in the pamphlet, and on pages 616-619, Volume 199, of the NEW ENGLAND JOURNAL OF MEDICINE.

Dr. Stevenson moved that the various committee reports be accepted as printed. Motion seconded, and carried.

PRESIDENT JOHNSTONE: The reports are accepted as printed.

Any unfinished business to come before this meeting?

Dr. Ricker stated he thought there was none at this time.

PRESIDENT JOHNSTONE: Any new business? The place of the next meeting?

Dr. Blodgett invited the Society to hold its 1929 meeting in Bellows Falls, making his invitation as a motion.

Motion seconded by Dr. Hyde.

PRESIDENT JOHNSTONE: All in favor of having the next annual meeting at Bellows Falls will say aye; opposed, no. The ayes have it and the next annual meeting will be at Bellows Falls.

Any other new business?

DR. LANE: At a special meeting of the Bennington County Medical Society the following resolution was adopted. (Read, as follows):

Whereas, the State of Vermont has received a large number of irregular practitioners who have been expelled from neighboring States and

Whereas, the wording of the Vermont Medical Practice Act and the Acts under which Osteopath, Chiropractors and other Cults operate are indefinite and fail to define the limitations within which the various Cults may practice, so that the Cultists thereby who know nothing of Medicine may treat pneumonia, diphtheria and may prescribe morphine and alcohol without violating any law.

Therefore be it resolved that we the members of the Bennington County Medical Society deplore this condition and hereby petition the Medical Society of the State of Vermont to instruct the Legislative Committee to secure such changes in the Laws of the State of Vermont as shall definitely establish the limitations of the rights of the various types of irregular practice.

Committee JOHN D. LANE, M.D.,
Bennington County Medical Society.

DR. STEVENSON: Don't you think it would be wiser for this House of Delegates to appoint a committee to investigate this whole thing? You can have the committee pass any legislation you want, but when you go to Montpelier they will want to know something definite, and we have got to give them something definite, so I would suggest, if it be the will of the House of Delegates that a committee be appointed by this House of Delegates to investigate this whole thing.

PRESIDENT JOHNSTONE: Would it be better to appoint a committee for just this or leave it in the hands of our legislative committee of three members?

DR. STEVENSON: I think it would be better to leave it in the hands of the Legislative Committee and ask them to investigate it.

DR. CHAPMAN: I move that the Legislative Committee be instructed to investigate this matter embodied in the resolution just offered, and turn that over to the Legislative Committee.

Motion seconded.

PRESIDENT JOHNSTONE: All in favor will say aye; opposed, no. The ayes have it.

Dr. Black moved that the House of Delegates go into a committee of the Whole.

Motion seconded, and carried.

The President vacated the Chair.

The Committee of the Whole rose, and the President resumed the Chair.

PRESIDENT JOHNSTONE: Any further business, new business?

DR. ADAMS: Mr. Lawrence, in his paper this morning, issued an invitation to this Society to send a speaker to their meeting in Barre next week, and this was handed along to me as being more or less of an obligation, perhaps a positive obligation, of the House of Delegates, to appoint, or elect, a person to go up to Barre next week to speak on medical conditions in rural districts.

Moved that the invitation tendered be accepted.

Motion seconded and carried.

Dr. Hyde nominated Dr. Burbank as such speaker.

Dr. Stevenson moved that Dr. J. N. Jenne, Dean of the Medical College, be sent as such speaker.

Motion seconded.

Dr. Hyde withdrew his nomination of Dr. Burbank.

PRESIDENT JOHNSTONE: All in favor of having Dr. Jenne go from the State Society to talk before the Grange next week, Tuesday night, will say aye; opposed, no. It is a vote and so ordered.

Dr. Stevenson moved that the House of Delegates again go into a Committee of the Whole.

Motion seconded and carried.

The President vacated the Chair.

The Committee of the Whole rose, and the President resumed the Chair.

PRESIDENT JOHNSTONE: Any other new business?

DR. MAYNARD: Wouldn't this be a good time to amend our By-Laws and Constitution to read, in substance, that hereafter anyone, to become a member, must first become a member of the county society of the county in which he resides and practices, providing there is an existing society in that county?

DR. RICKER: If the body as a whole is in favor of such action, it can be carefully worded by the proper committee and submitted at the meeting in the morning. I think that is the proper thing to do. There is a lot of implication in our By-Laws, one that a man shall be a member of the society within his own geographical unit. The whole organization is composed of county societies, geographically, but it is not clearly stated.

DR. HYATT: I think one of these articles might be amended to incorporate that, but before it is done we should think of some things. Occasionally it is possible that a man would like to retain his membership in another county, and for a good reason. Perhaps Article 16 would entirely cover that. (Read Article 16, 14 and Sec. 8.)

DR. MAYNARD: I move that a committee be appointed by the Chair to amend the By-Laws to read somewhat in this fashion: that hereafter a physician must become a member of the county society in the county in which he resides and practices, provided there is such a society, as his first membership.

Motion seconded.

PRESIDENT JOHNSTONE: You want the privilege of having this committee go over the motion with you, and framing it, and handing it in at the adjourned session tomorrow morning.

DR. MAYNARD: Yes.

Motion seconded.

PRESIDENT JOHNSTONE: All in favor will say aye, opposed, no. The motion is carried.

A DELEGATE: Shouldn't it also be stated in the negative form? You cannot compel a man to become a member. He may not become a member in any county society without the consent of the county society of the county in which he lives.

PRESIDENT JOHNSTONE: I will appoint as such committee Dr. Maynard, Dr. Hyatt and Dr. O'Brien, to work in conjunction with our Secretary this evening.

Suggested that the reporter obliterate her notes, and that a resolution, which Dr. Maynard will pass in, will take the place of the reporter's notes, and the committee have authority to make a new resolution and full report.

DR. CRAM: There is one thing that has been discussed, regarding the Workmen's Compensation Act, in regard to fees and hospitals and doctors, that the doctors are not getting their share. The fees for the doctors being only $50 for two weeks, while the hospital has $100 or $150 allowed it.

I move that our Legislative Committee investigate this and see if there can't be a proper balance brought about by a modification of this law.

Motion seconded.

DR. HYATT: I think, Dr. Cram, when any of these cases happen, and you are called to take charge of a case, which you see is going to eat up more than the $50, if you will put yourself in connection with the insurance company and tell them you will stop when that $50 is used, unless they will agree to pay you, that they will pay you.

DR. PATCH: I have had that experience.

DR. CRAM: My idea was to investigate this non proportion of fees. My idea is for the Legislative Committee to investigate that and make an adjustment so that that other $50 can be used as a medical fee. The hospital can collect $150, and there is sometimes $50 over, which the physician in many cases should have.

I move that the Legislative Committee be instructed to investigate the Workmen's Compensation Act, and bring about such modifications

of that as shall equalize the medical fee and the hospital fee.

Motion seconded.

PRESIDENT JOHNSTONE: All in favor of that motion say aye; opposed, no. The motion is carried.

The next business is election of officers for the ensuing year.

DR. STEVENSON: I think under this order of business it has been customary to elect the President and Secretary. I would place in nomination for President Dr. C. F. Dalton. Nomination seconded.

Moved that nominations close and the secretary cast one ballot for Dr. C. F. Dalton, for President.

Motion seconded and carried.

PRESIDENT JOHNSTONE: The Secretary cast one ballot for C. F. Dalton for President, and I declare him elected.

PRESIDENT JOHNSTONE: Nominations for Secretary.

DR. STEVENSON: I nominate Wm. G. Ricker for Secretary. Seconded.

Moved that nominations close, and the Secretary cast one ballot for Wm. G. Ricker. Motion seconded, and carried.

PRESIDENT JOHNSTONE: The Secretary has cast one ballot for William G. Ricker for Secretary, and I declare him elected.

DR. STEVENSON: I move that a committee of three be appointed by the Chair to bring in the rest of the nominations and present them at the adjourned session tomorrow morning, at the House of Delegates.

Motion seconded, and carried.

PRESIDENT JOHNSTONE: I will appoint as such committee Dr. Stevenson, Chairman, Dr. Farmer, and Dr. Lane.

DR. O'BRIEN: I move that the meeting adjourn until tomorrow morning at 8:30, this same room. Motion seconded and carried, and adjournment taken until Friday morning, Oct. 12, 1928, at 8:30 A. M., same room.

Friday morning, October 12, 1928, the adjourned meeting of the House of Delegates, reconvened in Lecture Hall "A" of the Medical College Building, Burlington, Vt., at 8:30, the meeting being called to order by Dr. W. M. Johnstone, President of the House of Delegates.

PRESIDENT JOHNSTONE: We will come to order and listen to the report of the Nominating Committee.

Dr. Stevenson, reporting for the Committee appointed by the Chair to bring in nominations: —The Committee submit the following names:

President: Charles F. Dalton.
Vice President: George Anderson.
Secretary: Wm. G. Ricker.
Treasurer: David Marvin.
Auditor: W. M. Johnstone.
Anniversary Chairman: J. H. Blodgett.
Executive Committee: W. G. Ricker, A. L. Miner, James Hamilton.
Publication Committee: W. G. Ricker, C. F. Dalton, J. A. Wark.
Medical Education: A. B. Bisbee, H. S. Goodall, S. W. Hammond.
Necrology Committee: L. A. Russlow, B. D. Adams, H. S. Pierce.
Medico-Legal: E. A. Hyatt, J. N. Jenne, Wm. Bryant.
Health and Public Instruction Committee: P. E. McSweeney, E. J. Quinn, H. F. Taylor, A. L. Patch, C. F. Dalton.
Legislative Committee: C. H. Beecher, T. S. Brown, M. F. Maguire.
Delegates:
Maine, F. E. Farmer.
New Hampshire, O. W. Daley.
Massachusetts, A. C. Black.
Rhode Island, Chas. Buchanan.
Connecticut, B. A. Chapman.
New York, John D. Lane.
American Medical Association: Wm. G. Ricker.
Alternate Medical Association: C. H. Beecher.
Nominees for Board of Medical Registration:
To succeed W. Scott Nay: W. Scott Nay, L. A. Russlow.
To succeed F. E. Farmer: F. E. Farmer, A. M. Cram.
New England Medical Council: C. F. Dalton, Wm. G. Ricker, E. A. Hyatt, F. E. Farmer, J. A. Stevenson.

HOUSE OF DELEGATES

President: B. D. Adams.
Vice-President: L. H. Ross.
Second Vice-President: H. G. Ripley.
Secretary: J. E. O'Brien.

DR. O'BRIEN: I move that the Secretary cast one collective ballot for the nominations as submitted.

Motion seconded, and carried.

PRESIDENT JOHNSTONE: The Secretary has cast one collective ballot for the nominations as submitted, and I declare these parties elected, respectively, to fill the various offices and committees for the ensuing year.

Next is officers for the House of Delegates.

DR. PATCH: I move that the Secretary cast one collective ballot for the nominations as submitted. Motion seconded and carried.

PRESIDENT JOHNSTONE: The Secretary has cast one collective ballot for the nominees, as submitted, for officers for the House of Delegates for the ensuing year, and I declare them elected.

PRESIDENT JOHNSTONE: Any other business?

DR. HYATT: For the committee appointed to bring in proposed amendments to the Constitution and By-Laws:—It is proposed to amend Article IV of the Constitution—Meetings to read as follows:

> *There shall be an annual meeting of this Society held in October, at such place as shall be designated by vote of the House of Delegates at the previous annual meeting.*

Moved that the proposed amendment be accepted. Motion seconded.

PRESIDENT JOHNSTONE: It is moved and seconded that this proposed amendment to the Constitution be accepted. All in favor of this change

will say aye; opposed, no. It is a vote and so ordered.

DR. MAYNARD: From the same committee:—It is proposed to amend Article XIV of the By-Laws, entitled "Members from No-Society Counties", to read as follows:

> *A physician or surgeon in good standing may become a member of the County Medical Society of that county only in which he resides. But, in counties not having a society he may become a member of the society of an adjoining county.*

Moved, and seconded that the proposed amendment be accepted.

DR. PATCH: The question of men in one county adjoining another county is taken care of?

DR. HYATT: Taken care of by Article XVI. This proposed amendment covers every situation that may rise. The change simply requires that when a man joins a society, for the first time, he must join the society of the county in which he resides, which allows him to join among men that know him, and that he knows.

QUESTION: Would it be necessary to say anything affecting members that belong to some other society at this time?

PRESIDENT JOHNSTONE: I think not.

QUESTION: Does that word adjoining mean geographically adjoining?

DR. HYATT: Yes.

PRESIDENT JOHNSTONE: The counties without societies are fully taken care of.

You accept a proposed amendment to the Constitution, and then it automatically comes under "Unfinished Business" next year.

DR. HYATT: In the Secretary's report he makes reference to the dues of the New England Medical Council. This Council has met two years, and is a representative body of members from each medical society of the New England States. Last year we appropriated for the expenses to this Council, $100, which is insufficient.

I move that this year the treasurer be authorized to appropriate for this purpose, $150.

Motion seconded.

PRESIDENT JOHNSTONE: Any discussion? All in favor of this motion will say aye; opposed, no. The ayes have it.

Any further business to come before the House?

DR. STEVENSON: I move we adjourn. Motion seconded.

PRESIDENT JOHNSTONE: The meeting is adjourned until the next annual meeting of the Society.

UNDULANT FEVER*

BY CHAS. F. DALTON, M.D.†

THE frequently changing problems of preventive medicine are illustrated at this time by the two latest diseases to claim attention, viz: tularemia and undulant (or malta) fever. Tularemia, a disease transmitted to man by handling infected rabbits, is due to Bacterium Tularense, and gives a train of symptoms, sometimes confused with typhoid fever. It is rarely fatal, but causes invalidism which may last several weeks. Tularemia has now invaded practically every state in the union except the six New England states, and plans are being made to introduce preventive measures into the legislatures of these states this winter.

Undulant fever, having been prevalent in the mid-western and south-western states for two or more years, has now gained a foothold in New England, and for that reason is made the subject of this paper in order to call the attention of physicians to possible cases which might otherwise be overlooked. At the time this subject was chosen, there were no known cases in Vermont—now two are on record and if the experience of other states amounts to anything, more will soon be found.

Reviewing briefly the history of the disease, we find that for many years its principal focus was on the Island of Malta, where it was encountered by the British army and navy, and to this circumstance owes the name Malta fever. The British medical officers studied the disease in considerable detail and one of them, Col. Bruce, discovered the specific organism in 1887. In his honor, and because of difficulty in nomenclature, this organism is now named Brucella.

The early cases were found to be due to ingestion of raw goat's milk and the general idea still prevails that the goat is the principal carrier of the infection. Later study, however, has determined the fact that cattle, hogs and horses may transmit the disease to humans and it may also, in rare cases, be communicated from man to man. Our concern lies in the knowledge that undulant fever is due to the same organism which causes contagious abortion in cattle, and that human infection may be obtained from ingestion of raw milk from infected herds, and also from handling of meat products and contact with discharges from infected animals. The possibility of infection through butter and cheese is also being seriously considered.

The extent of invasion of the dairy herds of New England by contagious abortion, also called Bang's abortive disease, is a matter of conjecture only. The Vermont Laboratory of Hygiene has been making agglutination tests for B. Abortus since 1915, but on submitted speci-

*Read at the 115th meeting of the Vermont State Medical Society, Burlington, October 11, 1928.

†For record and address of author see "This Week's Issue," page 847.

mens only, consequently no idea of the amount of infection is to be obtained from these tests. Various estimates range from 75% to 100% infection among the herds of the state, but all agree that Vermont cattle are heavily infected.

The same is undoubtedly true of every New England state. The Connecticut Commission on Domestic Animals estimates 75% of the dairy herds infected and that 20% of the cattle in these herds have the disease. Maine estimates 80% infected. The Division of Animal Industry of Massachusetts has no figures to submit but believes that the disease is widely and heavily spread throughout the cattle population of the state. New Hampshire is considered to have a large incidence of the disease. The Rhode Island Department of Agriculture has formulated an application and agreement for the prevention and repression of the disease, the plan to be carried out on a method similar to the accredited area system of T.B. eradication.

This widespread distribution of contagious abortion in cattle, together with the knowledge that undulant fever is produced by the same organism is the foundation for the belief that the human infection is perhaps more prevalent than has been recorded, and that this invasion may explain some of the continued fevers of obscure origin which have bothered physicians for years.

Since the recognition of undulant fever and its confirmatory laboratory test, a fairly good study of the disease has been made by the United States Public Health Service and also by several state health departments. Alice C. Evans of the Public Health Service has been the leading research worker in the federal service and the states of Michigan, Indiana, Iowa, New York and Connecticut have added considerably to our knowledge, many cases having been subjected to study. It is possible, therefore, to state with some accuracy the facts regarding the disease.

There are two varieties of the organism, recognized as Brucella Melitensis and Brucella Melitensis variety abortus with several strains of each. What difference these two types cause as to symptoms is not clear, although laboratory workers regard Brucella Melitensis as a much more dangerous organism to work with than variety abortus. Since both give the same agglutination test, the abortus variety is generally used as antigen.

The symptomatology of undulant fever is clouded by reason of the variety of types in which the disease may appear. Three groups are recognized, as follows: (1) undulant; (2) intermittent, and (3) ambulatory. Most of the cases studied follow a course which lasts several months. The fever is described in a publication of the Connecticut State Department of Health as follows:

"After an incubation period of from 6 to 15 days, a fever develops slowly, running higher in the afternoon than in the morning, and lasts, as a rule, from one to three weeks. Then the fever disappears and the temperature remains normal for two or more days, after which the fever returns in another wave or undulation lasting from one week to three or four weeks. This sequence is repeated again and again, the duration of the disease varying from 6 to 8 weeks to a year or two, the average time being about three months."

The early fever may be accompanied by chills and these in some cases persist at each new rise of temperature. Headache is a prominent feature in the early stages and frequently continues to be distressing, remitting and recurring with the fever. Other symptoms are profuse perspiration accompanying the chills, rheumatic pains and swelling of the joints, general feeling of exhaustion, loss of appetite and loss of flesh. Constipation is the rule. Urine and blood yield no characteristic data. The pulse rate usually parallels the temperature curve, if anything being slightly higher than expected.

The early diagnosis of the disease is extremely difficult because undulant fever is not suspected. Bassett-Smith, an English investigator, mentions the fact that the disease is seldom recognized in its early stages, even in countries where it is endemic. It is therefore not surprising to learn that most of the cases in this country have been treated for some other cause before undulant fever is thought of. Certainly New England physicians may be excused for any such lapse.

The diseases most frequently confused with this infection are: typhoid fever, because of the early febrile manifestations; malaria, on account of the chills and sweating, these occurring in some cases with a regularity of hours or days; tuberculosis, acute rheumatism, septic infection and in other states, tularemia. Diagnosis is almost invariably first suggested by the laboratory reaction.

Many states, including our own, are now making agglutination tests for melitensis on bloods sent in for Widals and showing negative results. Unfortunately dried blood does not give a sufficiently accurate reaction on which to venture a diagnosis. We have therefore recently been requesting physicians to submit fresh specimens of at least 2 c.c. from cases with negative Widals who carried a temperature over any extended time. In this way a case was found at Waterbury in the practice of Dr. W. H. Wright and another at Brattleboro by Dr. C. S. Leach. Dr. Wright kindly gave me the following record of his case:

Age 27. Nationality—American white, Occupation—Farming. Single.

Family History—Negative.

Personal History—Never any serious illnesses. Venereal disease denied. Has had several attacks of sore throat in the past but has not been bothered for the past year.

Present Illness—Has not been feeling well for several weeks past, has had much headache, and backache, and has felt weak and tired; at times has felt as though he might have a temperature and at other times would feel chilly, has not slept well at

night, appetite has been poor and he has lost weight.

Examination—Temperature 102F Pulse 108, Respiration 20 Throat, Nose and Mouth normal. Chest —Normal. Heart—Valve sounds clear, action somewhat rapid, normal in size, shape and position. Abdomen—Normal. G.U. Organs—Normal. Nervous System—Normal. Skin—Hot and dry, no eruption. Blood sent to the State Laboratory gave a positive reaction for Undulant Fever.

Treatment—Symptomatic.

Course of the Disease—My first visit was August 13th T.102, P.108, Resp.20; patient chilly and suffering from intense backache, also some pain knees and hips, feeling weak and tired but could not sleep.

Aug. 14th—Patient feeling some better today although he continues to feel exhausted and did not sleep well. T.101, P.100 and Resp.18. Passing fair amount of urine. Urine shows traces of albumen and cylindroids.

Aug. 15—Patient had a very uncomfortable night, did not sleep and was in much pain in his back and legs, headache severe. Appetite is very poor. Bowels somewhat constipated. T.100, P.96, Resp.18.

Aug. 16—Patient had a fair night. He slept quite well, perspired profusely while he was sleeping. T.100, P.96, Resp.18. Bowels active.

Aug. 17—Feels weak and exhausted, pain in head and back severe. T.100.4, P.78, Resp.18.

Aug. 18—Patient has not an ache or pain. T.101, P.89, Resp.18.

Aug. 19—Patient feels quite well today although he is weak. T.98, P.65, Resp.16. Has asked for something to eat. Temperature did not return and at the present time patient feels well, much better than he has for months.

I interviewed patient recently to try and ascertain if possible the source of his infection. On the farm where he lives they have never had but one cow that aborted and that was last spring; the milk from the particular cow was never used except to feed calves."

Dr. George H. Coombs, Director Division of Communicable Diseases of Maine State Department of Health, reports six recognized cases in that state. One of the suggestive histories is the following:

"Man, age 25, who had used a good deal of raw milk on cereals, but never drank it. The herd from which he had this milk had an undoubted contagious abortion case about five weeks before his illness. His temperature went up to 104 degrees and stayed there for eight days; dropped to normal or sub-normal and stayed at that point for eight days, when it went up again. It was on this rise that we got his blood. After the third fall and rise in temperature the afebrile period became lengthened to sixteen days and then to six weeks. In the first two paroxysms the man had chill and sore throat, also enlarged sensitive spleen. With the first he had an inflamed knee joint, and with all of them profuse sweating and intense mental depression.

He lost a large amount of flesh."

It is interesting to observe that most of the patients are users of unpasteurized cow's milk, although there is no constant mention of such use in large quantities. Some have used such milk only on cereal. Nor is it always possible to check up the milk production with a herd containing aborting cows. A few cases have been definitely traced to infection from handling hogs. Age apparently has no effect on the disease, the literature showing some over sixty and others in young persons in the teens. Possibly young adults constitute the majority of cases. So far as recorded no cases have occurred during the first four years of life.

The control of undulant depends upon the prevention of Br. Melitensis infection in animals, and from this we have little to hope at present. Dairymen and veterinarians are only beginning to attack the problem and the avenues of infection are so numerous and insidious that a situation is presented analogous to tuberculosis infection, if indeed it does not surpass this in importance. Much study of the medical and economic problems will be required before any system of control can be worked out. The use of pasteurized milk is argued as a preventive measure, but in a rural state like Vermont, such a course is neither practical nor possible. Cleanliness among those who work with cattle and hogs is to be advised as a safeguard against infection from discharges carrying the organism.

There is little to say as to treatment. A vaccine made from Br. Melitensis and sensitized by the addition of blood serum from a recovered case has been used with good effect in a few cases. Serum treatment alone is disappointing. There remains then only a course of symptomatic treatment and this is the procedure in general use.

Discussion

Dr. John H. Blodgett: I thought I had a case of undulant which I could report at this time, but the laboratory states that the agglutination test does not show a positive reaction.

I thank the State Board for calling attention to the presence of this fever in adjoining states and the possibility of the same in our own state. I frankly had forgotten that there was such a disease.

This patient left Bellows Falls August 12, was in Boston, Brockton and neighboring places and was taken sick on the return trip home in Keene, N. H., on the 19th. There was violent intestinal disturbance with a temperature running to 103; there was a remission at the end of two weeks with a return of all the symptoms.

A point in the differential diagnosis from typhoid fever was that the patient mentally was very alert, there was no enlargement of the spleen, and there were no rose spots. In other respects this attack was like that of typhoid fever. The patient was a bookkeeper, 65 years of age, female, and had more or less chalky deposits in her joints. The secondary symptoms were apparently identical with those of undulant fever, excepting that there was fluid in the left knee and the joints were swollen. A later development was the discovery of several pus sockets in the teeth with one abscess formation.

As an aid in differential diagnosis, the nurse and a sister had influenza symptoms followed by various neuralgias. With these symptoms and the laboratory report, we have to consider the case as one of intestinal influenza and not of undulant fever.

Case Records of the Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 14361

COUGH, DYSPNEA AND PURULENT SPUTA

MEDICAL DEPARTMENT

First admission. An unmarried Irish housekeeper seventy-five years old entered November 22 complaining of cough with sputum.

The symptoms began six days before admission, worse in the morning but lasting all day and troubling her at night. She continued to do light work. Two days before admission she first saw a physician. The condition grew worse until at admission she was much pressed for breath.

She had had similar attacks the previous winter and the winter before for which she was treated at another hospital. Both attacks started with bad coughs lasting about a month. Shortness of breath was her chief trouble. This had been present for eleven years and was always aggravated by her attacks.

Her family history is unimportant.

She had typhoid fever at thirty-five. For years her throat had felt dry and hoarse and her breathing had been emphysematous. Five years ago she had influenza during an epidemic. For the past few years she had had frequent belching of gas. Recently she had had trouble with hemorrhoids. Her memory was failing with age.

Clinical examination showed a dyspneic old woman sitting up in bed, breathing with an expiratory grunt, coughing a good deal and raising purulent sputum. The mucous membranes showed slight pallor. Sclerae injected, subicteroid and showed purulent discharge. The remaining teeth carious. Pyorrhea. Tongue dry and coated. Mucopurulent material on the anterior pharynx. Chest expansion poor, equal on both sides. Lungs: medium and coarse consonating râles throughout, more at the bases posteriorly. Occasional squeaking inspiration throughout. Tactile and vocal fremitus normal. Slight dullness at the right base posteriorly, inspiration loud and high pitched, whispered voice present. Apex impulse of the heart not found. Left border of dullness 9½ centimeters to the left of midsternum, ½ centimeter outside the midclavicular line, supracardiac dullness 7 centimeters, right border 4 centimeters. Action regular. Sounds apparently of good quality but largely obscured by lung sounds. No murmurs. Radials palpable. Blood pressure 180/90. Abdomen slightly distended; palpation unsatisfactory. Pelvic examination: fundus palpable, apparently enlarged and very hard.

Amount of urine normal, specific gravity 1.006 to 1.022, urine alkaline at one of six examinations, neutral once, no albumin or sugar, occasional leukocytes at all but two sediment examinations, occasional red cells at 3. Renal function 30 per cent. Blood: hemoglobin 80 per cent, reds 4,112,000 to 4,300,000, leukocytes 10,800 to 24,800 to 6,000, polymorphonuclears 86 to 83 per cent. Non-protein nitrogen 30.8 milligrams. Wassermann negative. Sputum negative for tubercle bacilli. Smith stain showed numerous leucocytes, many intra- and extracellular small Gram-negative organisms, probably influenza bacilli, also a few Gram-positive diplococci in short chains. Another examination showed also many pus cells and a few pneumococci. In a third examination the Gram-negative bacilli predominated. Throat culture, no diphtheria bacilli; streptococci present.

X-ray examination showed mottled dullness extending outward and downward from the right lung root along the course of the right descending bronchus, not obscuring the outline of the diaphragm. Its appearance was somewhat suggestive of dilated bronchi. The heart shadow was prominent to the left. There was some prominence of the aortic knob. The outline of the diaphragm was sharply defined.

For four weeks temperature 99° to 104.3°, after December 19 not above 100.8°, after January 5 normal. Pulse 71 to 100 for the first four weeks, afterwards 64 to 95. Respirations 20 to 47 until December 28, afterwards not above 30, after January 2 normal.

The day after admission the patient was put on the dangerous list. The breath and sputum were slightly foul. She was very drowsy, perhaps because of morphine. She continued in about the same condition until December 10. Then she vomited. Two days later she had considerable pain in the left chest anteriorly and a loud friction rub in the left axilla. A tight chest swathe gave entire relief. After this she made steady improvement. December 24 she was up in a chair. December 27 there was slight edema of the legs and over the sacrum. She was put upon digitalis. Throughout the illness the slow pulse was an interesting feature. The lungs cleared up except for some râles at the right base. January 28 she was discharged.

History of interval. After two weeks in a convalescent home she felt much better, and returned to her former place, doing light work three hours a day. During each of the next two winters she had attacks of excessive coughing and shortness of breath lasting a month or six weeks. September 20 of the third autumn she again began to have dyspnea and cough with sputum. She was more comfortable sitting up.

She continued to have palpitation and dyspnea on going up two flights of stairs as she had for the past five years. She occasionally had much gas.

Second admission, October 4, two years and eight months after her discharge.

Clinical examination was much as before. She was poorly nourished. Barrel chest and hyperresonance are now mentioned. Heart sounds of poor quality. A systolic murmur at the apex. Blood pressure 140/80. Wassermann negative. Smith stain showed the predominant organism in the sputum to be a small Gram-positive diplococcus.

X-ray examination showed the chest much as it appeared three years earlier. The process was largely in the region of the descending bronchi and around the roots of the lungs. It was rather characteristic of asthma. The plate was not entirely satisfactory because she could not hold her breath. The heart was not examined.

By October 15 the acute process had subsided. The patient continued however to be very weak and dyspneic and to raise much foul sputum. October 25 she was discharged.

History of interval. During the following month she was very weak and attempted no work. For the next nine months she continued her light work and felt fairly well. At the end of the following August she commenced to feel weak and tired and contracted a cough with yellowish sputum, she thought because she stopped taking brown pills which Dr. Paul White had given her. During the following week she was in bed off and on. She often felt hot and had some sweating. She had had no pain, palpitation, edema or nocturnal dyspnea. She slept on two pillows, but would have liked to sleep higher. She complained of dimness of vision of the left eye, worse in recent months. She occasionally urinated once or twice at night. She had occasionally had paresthesias of the left hand. The history is meager in details because of her lapses of memory.

Third admission, September 5, ten months after her last discharge.

Clinical examination. Well nourished, sitting up with a back rest, dyspneic, with slight cyanosis of the lips and occasionally coughing up a teaspoonful of yellow-green odorless sputum. Lungs resonant, slightly duller on the left, especially at the base posteriorly. Expiration prolonged. Coarse moist and musical râles throughout, especially on expiration, more in the back. Apex impulse of the heart vaguely palpable. Its location is not recorded. Left border of dullness 10 centimeters from midsternum, 2.5 centimeters outside the midclavicular line, right border 3 centimeters, supracardiac dullness 7 centimeters. Action regular at 90. Sounds somewhat obscured by respiratory noises. First sound short and soft. Second sound not made out. No murmurs. Artery walls palpable but not markedly thickened. Pulses of fair strength. Blood pressure 160/83 to 168/90. Abdomen distended, tympanitic. No edema of the ankles.

Urine normal in amount. A catheter specimen showed colon bacillus, a Gram-negative spreader bacillus and an encapsulated Gram-negative bacillus. Specific gravity 1.024 to 1.025, cloudy or hazy at both of two examinations, red at one, a trace of albumin once. Blood: 10,600 to 17,900 leucocytes, 56 per cent polymorphonuclears, hemoglobin 95 per cent, reds 4,400,000, slight anisocytosis, rare basophilia. Wassermann negative. Non-protein nitrogen 37 milligrams. Icteric index 6.

Temperature 98° to 103.8°, pulse 70 to 110, respirations 17 to 41.

The condition became worse except for slight improvement September 8 with the drop in temperature. The patient was euphoric but rather irrational. She had urinary retention with overflowing. September 19 she died.

Discussion

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY AND THE PHYSICAL EXAMINATIONS

The lung signs show bronchitis with or without pulmonary edema. There is no evidence of consolidation or pneumonia.

I should say that the urine is normal.

The last two weeks of her first admission she had normal temperature.

"The breath and sputum were slightly foul," perhaps from retention in the dilated bronchi of which they have told us.

"There was entire relief from a tight chest swathe." We shall have to say that she had acute pleurisy, as far as I see, not going on to effusion but subsiding. Pleurisy does that very often, i. e. is nothing more than a serofibrinous exudate.

"December 27 there was slight edema of the legs and over the sacrum." That is the first we have heard of edema. Many people, especially old people, when they get up after being in bed for some time have edema of the legs which disappears after a short time.

"January 28 she was discharged." I should say she had an old bronchitis upon her arrival, that some bronchopneumonic patches developed which resolved again, so that she went out well. We shall see when we come to the later history if there is anything to show for that apparently solid patch.

"During each of the next two winters she had attacks of excessive coughing and shortness of breath lasting a month or six weeks." You may take that to mean that she had attacks of bronchopneumonia, as people with bronchitis are apt to, or that she had attacks of cardiac weakness with edema of the lungs.

The sputum showed a small Gram-positive diplococcus. Does that mean anything, Dr. Mallory?

DR. TRACY B. MALLORY: I doubt it.

DR. CABOT: That foul sputum is of great importance, if true. It almost always goes with abscess.

I think the blood pressure is interesting in comparison with the heart sounds. You would rather tend to think the heart was not doing much. But a heart that will give a blood pressure reading of 168 is doing a lot. The loudness of the heart sounds, unless you follow them in the same patient from day to day, does not tell you much. The comparison of one patient's heart sounds with another patient's heart sounds is not of much use.

There is nothing in the second examination in addition to what was given before. Just why she should have pulled through the other two attacks and not this one is not clear.

DIFFERENTIAL DIAGNOSIS

I see nothing to call our attention to any part of the body except the chest. We have no abdominal symptoms, nothing in the nervous system or extremities. What shall we say about her heart and lungs? The evidence is of a chronic cough with three acute attacks of what seems like bronchopneumonia, with a sputum that has been purulent and sometimes foul, with an X-ray which the first time certainly suggested bronchiectasis, the second time nothing in particular to me. But I take it bronchiectasis never gets well. So if she had it once she had it again. Bronchiectasis is part of a process that usually gets outside the bronchi as well, with an interstitial increase. Hence I suppose there will be some increase of interstitial tissue or some chronic pneumonitis in this case in addition to bronchiectasis.

There is no evidence of tuberculosis, no evidence of malignant disease. I see no evidence of emphysema, but she may have it. I do not at the present time know any physical signs on which we can make that diagnosis; and there is nothing mentioned here about the X-ray or the position of the diaphragm or other points that is at all reliable.

I have no doubt that all these lesions were to some extent complicated by passive congestion. It is very seldom that a person of this age has such a long cough as this without some element of cardiac congestion. Hence I think Dr. Mallory will tell us there is some chronic passive congestion depending upon the weakness of the heart. If there is any cardiac enlargement it is probably associated with arteriosclerosis rather than with any valvular trouble,—simple hypertrophy and dilatation of the heart. What is the cause of the cardiac weakness? In such a case it usually depends upon chronic hypertension. I think we should find a heart showing some enlargement, hypertrophy and dilatation, but no valve trouble. It is pretty safe to say arteriosclerosis also.

A STUDENT: What is the significance of the Gram-negative bacilli in the urine?

DR. CABOT: I should suppose that that finding is of no importance.

DR. MALLORY: There was probably a slight pyelitis.

DR. CABOT: I do not believe anything important will be found in the urinary tract.

A STUDENT: Does not barrel chest with hyperresonance point to emphysema?

DR. CABOT: No. It does in the textbooks, but nowhere else. It is very common to find a "barrel chest" in elderly people. Most of these cases at necropsy have not shown emphysema when they have had only that clinical evidence. Barrel chest and hyperresonance never have been physical signs characteristic of emphysema. There has been supposed to be evidence of it in decreased fremitus, in decreased breath and voice sounds, in the position of the diaphragm and also in a characteristic X-ray. If a person had all that evidence he might make a clinical diagnosis of emphysema. But most of the cases which we have found at necropsy were not expected during life. I have had a number of talks with Dr. Francis W. Peabody on this subject. He had taken a great interest in emphysema and had done valuable work upon it. He agreed that we cannot make a diagnosis on signs such as are recorded here. He thought the diagnosis could be made by X-ray evidence, especially by the low position and limited motion of the diaphragm and the increased transparency of the lung fields. He had been interested chiefly in the chemistry of the air in the lungs under those conditions and thought the condition ought to be studied a great deal more, but his clinical experience was not any different from mine about the so-called barrel chest and hyperresonance. For many years in my textbook on physical diagnosis I gave a full account of the physical signs of emphysema; but it was all wrong. I took it out five years ago and substituted an account of the barrel chest itself, which I believe is a change in the bones happening in old age and leading to hyperresonance, but not to emphysema.

A STUDENT: Can you make a diagnosis of bronchiectasis just on the dilated bronchi or characteristic sputum?

DR. CABOT: On the former if you are sure. I cannot, but I believe the X-ray man can, without the sputum. Did she have any characteristic sputum? Ordinarily the characteristic sputum is in large amounts raised within a relatively short space of time, perfectly clear pus with influenza bacilli in it. That description of her cough does not sound like bronchiectasis. But when the sputum is described as being foul it does sound like bronchiectasis. I do not think we have the whole picture. I should say it is rash to diagnose bronchiectasis on the X-ray alone or the sputum alone.

A STUDENT: Is it not possible that she died of septicemia?

DR. CABOT: Yes, I think that is a pretty good guess, although I think there is no evidence of it. She perhaps had some sort of terminal infection. It might have been a bladder infection. I do not believe she died of nephritis alone.

A STUDENT: Does not that second X-ray show increased pulmonary transparency?

DR. CABOT: I do not understand that it does. I think that appearance depends on the way it is taken. Certainly the diaphragm is not abnormally low.

A STUDENT: In a chronic bronchitis do not the bronchi always dilate?

DR. CABOT: How about that, Dr. Mallory?

DR. MALLORY: I think they probably would if it were continued over long period of time, a matter of years.

DR. CABOT: It seems perfectly reasonable to me. I have made the diagnosis of bronchiectasis. I am looking for it. But I shall not be very much surprised if I do not find it.

A STUDENT: Would not the systolic pressure of 160 despite the weakened heart sounds suggest emphysema?

DR. CABOT: You mean the emphysema gets between you and the heart? That is a good point, but I think "barrel chest" would do the same thing.

A STUDENT: Why did she have such a slow pulse during her whole disease?

DR. CABOT: She had a pulse of 110 in the second attack, not extremely low. We are not told about the rate of the pulse in the early part of the second attack. It was a mild subacute rather than an acute virulent type of infection.

X-RAY INTERPRETATION, FIRST ADMISSION

The appearance is that of a bronchial and peribronchial process involving the right lower chest, possibly pneumonic.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Hypertensive heart disease.
Hypertension.
Congestive failure.
Bronchopneumonia.

DR. RICHARD C. CABOT'S DIAGNOSIS

Bronchiectasis.
Possibly emphysema.
Chronic passive congestion.
Arteriosclerosis.
Possibly hypertrophy and dilatation of the heart.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Purulent bronchitis.
Bronchopneumonia.

2. *Secondary or terminal lesions.*

Hypertrophy of the heart, slight.
Chronic passive congestion, slight.

3. *Historical landmarks.*

Adenoma of cortex of left adrenal.

DR. MALLORY: I think these necropsies of very old people can be divided into two types. In one group you find about three or four fatal lesions and in the other you do not find any. This case belongs more or less to the latter. She had a very severe chronic purulent bronchitis without, however, any dilatation of the bronchi. There was no emphysema to speak of.

The heart weighed 380 grams. For a woman of her age and size that is a little bit large. The valves were entirely negative. The muscle appeared perfectly normal. The coronary arteries showed a slight degree of sclerosis but no occlusion of the lumina.

There was chronic passive congestion, and one anomaly, an adenoma of the left adrenal,—of course of no significance whatever.

The kidneys were negative, no evidence of pyelitis or cystitis. So that as the cause of death we have only a purulent bronchitis and very mild bronchopneumonia.

DR. CABOT: Dr. Mallory, may I put a question in this form: suppose someone had shown you this heart without telling any more about the rest of the necropsy, should you have known it was the heart of a person who had had chronic passive congestion of the lungs?

DR. MALLORY: No. The only evidence I have that the heart did not work properly is the chronic passive congestion shown in the lungs and liver.

DR. CABOT: Then it does not necessarily show in the heart when we have a heart that is not working properly.

DR. MALLORY: Not in the least.

A STUDENT: How do you account for the fact that the renal function was thirty per cent?

DR. CABOT: Thirty per cent is very good; even ten per cent is good. I have seen ten per cent with normal kidneys again and again. I have not often seen five per cent with normal kidneys, and I think I have never seen zero. Thirty per cent is normal.

CASE 14362

AN OBSCURE HISTORY OF DISEASE INVOLVING THE CENTRAL NERVOUS SYSTEM

CHILDREN'S MEDICAL DEPARTMENT

An Irish-American girl three and a half years old entered August 16.

August 13 she began to have pain in the right side which interrupted her sleep. A physician gave a cathartic with some relief. August 15 the pain was worse and she had pain in the head and back also, persisting until admission.

The family history is unimportant.

The past history is negative except for whoop-

ing cough a year before admission. For four or five months the child's legs had been getting thin.

Clinical examination showed a fairly well developed and nourished child not apparently in acute pain, answering all questions asked. Throat moderately injected. Neck somewhat resistant. Heart, lungs, abdomen, extremities, genitals and pupils normal. Knee-jerks absent. Kernig not positive, but the child complained when the legs were lifted. Babinski negative.

Urine and blood not recorded. Temperature 100.7° to 103.1°, rectal. Pulse 138 to 156. Respirations 48 to 23.

The day after admission a lumbar puncture showed a pressure of 200. The fluid showed 45 to 50 cells. The visiting physician found no Kernig or stiff neck, and no tenderness of the thighs. The knee-jerks were normal. The pharynx was red and injected. The general condition failed. August 18 there was respiratory involvement requiring artificial respiration. 25 cubic centimeters of 15 per cent salt solution was given intramuscularly. She showed some flushing, but no other reaction. The respiratory involvement steadily increased. That afternoon she died.

Discussion

BY ARTHUR BATES LYON, M.D.

This history is reduced to the merest skeleton. The admission record helps very little in the matter of diagnosis. In a child of three and a half years not too much trust is to be put in the subjective localization of pain. To know something of the other symptoms would have been of value. Did the illness begin as suddenly as the story suggests? That the legs had been getting thin for several months may mean nothing, or it may mean that something had been wrong for a much longer time than the three days' story would indicate. Was there fever and vomiting? Was the child prostrated, irritable, restless? These things we do not know. We are left with the fact of persistent pain or discomfort somewhere for three days, possibly with constipation.

I am inclined to attach no importance to the history of whooping cough a year before.

Nor is the physical examination conclusive. There is a red throat, there is fever, a decidedly rapid pulse and at times a notably increased rate of respiration. The "somewhat resistant" neck and the disinclination to have the legs raised suggests, of course, irritation of the central nervous system. So also does the absence of the knee-jerks. But the findings are not very definite, and a subsequent examination apparently discounts most of them. Incidentally some stiffness of the neck may be shown with acute otitis media—a fact not to be forgotten. I suppose this was not the case here, though nothing is said about the ears.

It is not until we come to the lumbar puncture that there is anything very definite to go on. The manometric pressure is high for a child quiet and lying on its side, which I suppose we must take for granted was the case. Forty-five to fifty cells is also abnormal. Ten would be the upper limit of normality. We are told nothing regarding the type of cells found, nor whether increased protein was present in the fluid, nor whether the sugar content was normal, elevated or lowered. We do not know whether a pellicle formed in the fluid on standing.

For all that we do not know, a spinal fluid under increased pressure and showing a count of forty-five to fifty cells surely indicates a central nervous system involvement. A purulent meningitis is of course ruled out, but the picture will go with one of three other conditions. We must consider tuberculous meningitis, infantile paralysis, and encephalitis.

I doubt if this is encephalitis. The spinal fluid pressure is less likely to be elevated in the last named than in either of the other two conditions; the cell count with encephalitis is less certain to be raised. There is often an increased power of reducing Fehling's solution with encephalitis. Moreover, involvement of some of the cranial nerves is usual in encephalitis, and there is no suggestion of that here.

As between infantile paralysis and tuberculous meningitis the decision is more difficult to make—almost impossible. The spinal fluid—what we know of it—will accord with either. Infantile paralysis does not kill unless the bulbar region is involved, but that seems to have been the case here. Impressions are not always reliable, but I have a feeling that in obscure fatal involvements of the central nervous system in children, one may hazard the diagnosis of tuberculous meningitis and be right more often than wrong. The duration of symptoms is rather shorter here than is generally the case with tuberculous meningitis, but it is quite possible that the earliest symptoms in this case were overlooked. The lack of vomiting and the indefiniteness of the physical signs are also puzzling. But the situation must be met as one finds it, and tuberculous meningitis strikes me as the first choice for diagnosis. If it is not that it is poliomyelitis.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Acute poliomyelitis, bulbar type.
Respiratory failure.

DR. ARTHUR BATES LYON'S DIAGNOSIS

Tuberculous meningitis, or
Poliomyelitis.

ANATOMIC DIAGNOSIS

Anterior poliomyelitis.

DR. TRACY B. MALLORY: Necropsy showed two lesions of interest outside the central nervous system. These were marked prominence of the malpighian corpuscles of the spleen and some unusual lung findings.

The left lung was partially collapsed, the right lung considerably distended. The alveoli of the right lung could readily be made out on gross examination, and also numerous small air-filled sacs were noted between the layers of the pleura. The consistency was of the feathery type which is found in marked emphysema, particularly in cases of bronchial asthma dying in an asthmatic paroxysm. On pressure the tissue tended to pit deeply and did not recover its former outlines. Since no obstruction could be demonstrated in the bronchial tree it seemed fair to assume that the partial collapse of the left lung and the marked compensatory emphysema of the right lung were due to a paralysis of the left diaphragm and possibly of the left intercostals as well. It is too bad that the history does not give us a more definite statement of the character of the breathing during the last few hours of life.

The brain and spinal cord showed marked injection of the meninges and also of the nerve tissues. Minute hemorrhages could be made out within the pons and the medulla. The cervical cord showed a predominant hyperemia of the gray matter of the anterior horns and a few petechial hemorrhages.

Microscopic examination showed marked perivascular infiltration of lymphocytes in the anterior horns of the cord and slighter degrees of similar processes in the medulla and pons. In the cervical cord many nerve cells had disappeared and the spaces left by them were filled with endothelial leukocytes, lymphocytes and a few plasma cells. It was a slight early gliosis. Sections of the spleen showed numerous focal collections of endothelial leukocytes in the malpighian corpuscles. These histologic findings are sufficiently characteristic to warrant a positive diagnosis of poliomyelitis. They suggest a duration of several days, perhaps as much as one week. No significant difference in involvement could be made out between the left and right sides of the cervical cord. The finding of endothelial leukocytes in the malpighian corpuscles is characteristic of the disease and must be interpreted as evidence of a general toxemia.

DR. LYON: It is interesting to speculate what the outcome might have been had convalescent serum been available and administered as soon as possible after admission. The procedure may be regarded as still in the experimental stage; yet it is a very hopeful experiment. So far as knowledge goes the results have seemed often surprisingly good.

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DIFFUSE COMBINED DEGENERATION OF THE SPINAL CORD

IN textbooks of neurology one finds subacute combined sclerosis, or more properly diffuse combined degeneration, described as a disease of the spinal cord due to many causes. It has been reported in patients with so-called "toxic conditions", wasting diseases, prolonged suppurative processes, chronic digestive disturbances with diarrhoea, acute and chronic infections, and the anaemias. Although pernicious anemia is usually considered to be a very common cause, in the latest volume of Osler's *Modern Medicine* one finds the following statement: "The blood changes so commonly found in these cases are more often of the nature of a *secondary* anemia than of the pernicious variety."[1] This statement of Russel's cannot be accepted in the light of recent investigation and the contrary opinion is now usually expressed. Most cases, if not all of them, are associated with pernicious (Addison's) anemia.

Sometimes the first symptoms of pernicious anemia are persistent paresthesia of the fingers or toes, due to the involvement of the spinal cord by the disease. When the symptoms are so slight that only paresthesia is complained of, difficulty may be experienced in making a definite clinical diagnosis of spinal cord involvement; it will be found, nevertheless, that certain diagnostic signs are usually present even at this time. An alteration in the deep reflexes of the legs or a Babinski sign on one or both sides may help to confirm the diagnosis. The gait, in such an instance, may be slightly spastic in type. On the other hand, even more common signs are found which indicate some degeneration of the posterior columns of the spinal cord, the most constant of which is a loss of the ability of the spinal cord to transmit a sense of vibration from the lower extremities to the cerebrum and slight ataxia of the gait.

Even when the signs of diffuse combined degeneration of the spinal cord are well marked, the changes in the blood may be very slight. Cases are on record in which the spinal cord symptoms have lasted for a considerable number of years before there were any marked changes in the blood to indicate that one was dealing with a patient with pernicious anemia. It is equally well known, of course, that many patients with marked changes in the blood show practically no changes in the spinal cord, although symptoms indicating some abnormality of the central nervous system are present in 70 or 80% of the cases, this abnormality usually being persistent paresthesia of the extremities.

The pathological picture presented by a case of diffuse combined degeneration of the spinal cord is very characteristic. There is a microscopic moth-eaten appearance of the cord when stained by the Weigert method, especially well-marked in the posterior and in the lateral tracts, but the degeneration, as shown by the loss of myelin, extends rather diffusely around the whole of the spinal cord.

This pathological lesion, different from any other disease of the spinal cord, is being more clearly classified, as time goes on, as a distinct part of the syndrome which we call pernicious anemia and all the other causes, which were formerly considered as etiological factors, are gradually being erased. This process of elimination is largely due to the great interest shown in pernicious anemia since the work of Minot and his collaborators on the dietary treatment with liver extract. Some evidence is gradually being put forth also that the neurological signs and symptoms of diffuse combined degeneration of the spinal cord are relieved in part by the liver therapy, even when changes in the blood cannot be frankly demonstrated. Certainly one expects, under this modern method of treatment, to relieve the symptom of paresthesia. The amount of actual improvement in the ataxic or spastic gait or change in the reflexes shown by these patients is still debatable, although there is gradually being reached the conclusion that remission in these signs may take place under liver diet. If such is the case, additional evi-

dence is presented for the opinion that most cases of diffuse combined degeneration of the spinal cord are only a part of the disease which we now call pernicious anemia. The quotation, therefore, from Russel's article, which is given above, presents to the modern reader a distinctly erroneous idea of our present opinion about the spinal cord changes which he has described as subacute combined sclerosis. Is it not possible that this "disease" of the nervous system is only found as a manifestation of pernicious anemia?

REFERENCE

1 Russel, C. K.: Osler's Modern Medicine, 3rd ed., 1928, Vol. VI, p. 128.

THE NEW YORK MEDICAL CENTER

THE breaking of ground of the Medical Center, New York, took place nearly four years ago. Since that time the skyscraper buildings which are to be dedicated to the service of humanity and the progress of science have been built to satisfy the demands of medical men, patients and students.

The plot of ground on which the Medical Center has been constructed has long been given over to the people. First it was devoted to their amusement when the old American League Baseball Park was the mecca of excited and enthusiastic baseball fans which drew the crowds to Broadway and 168th Street. Next it was devoted to the religion of the people. Billy Sunday was the magnet at the time who again drew crowds to the site.

On Friday, October 12th, at 3 p. m. dedication of the entire Medical Center took place before a vast assemblage of persons who have been interested in the project from its inception. This marked the permanent surrender of the site to the people for their physical well being. Here again never ending crowds will come, this time seeking health. For all time this land is to be devoted to the trinity of medicine, teaching, research and care of the sick.

PROFESSOR VON MÜLLER'S LECTURE

IN these days of new diagnostic methods furnished by advances in chemistry, radiology, electro-cardiography, and immunology the older methods of physical diagnosis are apt to be neglected. Few papers devoted to auscultation and percussion now appear, and real contributions to these subjects have been rarely made in recent years. Yet a thorough knowledge of physical diagnosis is just as important now as ever. In fact the control of percussion and auscultation by radiological examination has greatly increased their value. Much still remains, however, to be learned about the origin and significance of acoustic signs revealed by auscultation and percussion.

No one has been more active in the advancement of physical diagnosis during the past twenty-five years than Professor Friedrich v. Müller, Director of the Second Medical Clinic of the University of Munich. Müller with his assistants, Selling, Edens and Martini, has studied the real physical nature of percussion and auscultatory phenomena and has introduced the terminology of physics. A pupil of Voit and a distinguished biological chemist himself, he has always recognized that to the clinician the stethoscope is of more importance than the microscope, and the percussion finger than a whole outfit of chemical apparatus. Professor Müller is a leading representative of the best in German medicine. He served his apprenticeship in clinical medicine under Carl Gerhardt, one of the great physicians of modern times. All who know Müller well must have been impressed with the influence that his old master has exerted on his life, and the regard and honor in which his memory is held. No German physician has kept in closer touch with American medicine than Professor v. Müller, and no foreign physician has done more for its advancement. He has twice visited this country. On both occasions he has given notable lectures and clinics. His contributions to our journals have been of a high order of merit. *The Archives of Internal Medicine* began its career in 1908 with the Harvey Lecture by v. Müller on nervous affections of the heart as its opening article.

We are fortunate in being able to present in this number the admirable lecture on the teaching of percussion delivered by Professor v. Müller before the Society of Internal Medicine of Copenhagen the past winter.* It was published in the special number of the *Münchener medizinische Wochenschrift* that marked the seventy-fifth anniversary of its founding. Through the courtesy of this journal we are allowed to present the lecture in full to our readers. It contains a valuable summary of the results of the recent investigations by Müller and his students. The excellent translation was made by Dr. Robert W. Buck of Boston, and it has been revised by Professor Müller himself. On September 15th the 70th birthday of this great clinician was celebrated. Old friends and students in this country join those of Germany in doing him honor and in wishing that he may be granted many years of continued activity for the good of the profession he loves so well.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

WHITE, PAUL D. A.B., M.D. Harvard, 1911. Instructor in Medicine, Harvard Medical School. Associate Physician, Massachusetts General Hospital. His subject is: "The Effect of Strain on the Heart." Page 801. Address: Massachusetts General Hospital, Boston.

*See page 807.

MÜLLER, FRIEDRICH v. M.D. University of Munich, 1882. Assistant to Professor Carl Gerhardt in Würzburg and Berlin 1882-1889. Privat docent, Berlin 1888. Professor, Bonn, 1889. Professor and Director of the Medical Polyclinic, Marburg 1892-1899. Professor and director of the Medical clinic Basle, 1899-1902, and of the Second Medical Clinic, Munich 1902 to date. Rector of the University 1914-15 Geheimrat. His subject is: "The Teaching of Percussion". Page 807. Address: Bavariaring 47, Munich.

PECK, MARTIN W. B.S., M.D. Harvard, 1915. Instructor in Psychiatry, Harvard Medical School. Formerly Chief of O. P. D., Boston Psychopathic Hospital 1922-1925. Assistant in Neurological O. P. D., Massachusetts General Hospital. His subject is: "The Meaning of Psychoanalysis". Page 814. Address: 520 Commonwealth Avenue, Boston.

JOSLIN, ELLIOTT P. A.B., M.D. Harvard Medical School 1895. Consulting Physician to the Boston City Hospital. Physician to the New England Deaconess Hospital. Clinical Professor of Medicine, Harvard Medical School. His subject is "Introductory Remarks to the Paper by Professor Lusk". Page 825. Address: 81 Bay State Road, Boston.

LUSK, GRAHAM. Ph.D., Sc.D., LL.D., Professor of Physiology, Cornell University Medical College. Member of National Academy of Sciences. His subject is: "On Diabetes". Page 826. Address: 477 First Avenue, New York City.

MILLER, JAMES RAGLAN. A.B., M.D. Johns Hopkins, 1911. F.A.C.S. Assistant Obstetrician and Gynecologist, Hartford Hospital; Gynecologist, Municipal and Mt. Sinai Hospitals, Hartford, Conn.; Physician-in-Chief, Hartford Dispensary. His subject is: "Melanoma (Melanotic Sarcoma) of the Ovary with Diffuse Discoloration of the Skin". Page 830. Address: 179 Allyn Street, Hartford, Conn.

DALTON, CHARLES F. M.D. University of Vermont, College of Medicine, 1903. Secretary and Executive Officer Vermont Department of Public Health since 1912. Professor of Hygiene and Preventive Medicine University of Vermont College of Medicine. Formerly President, Conference of State and Provincial Health Authorities of North America. President, Vermont State Medical Society. His subject is: "Undulant Fever". Page 837. Address: Burlington, Vermont.

MISCELLANY

A SPECIAL MEETING TO CONSIDER TULAREMIA

A special meeting of physicians will be held at Amphitheatre E at the Harvard Medical School on the evening of November 1st to consider the subject of Tularemia. Dr. Edward Francis, surgeon in the United States Public Health Service, who has made extensive investigations of the disease, will be the principal speaker. This meeting is being arranged under the joint auspices of the Harvard Medical School and the State Department of Public Health.

A conference of the Health Commissioners of the New England States and New York, representing the only area in which the disease has not appeared, has been called by the Massachusetts Commissioner on the morning of the same day, to consider means for preventing the introduction of the disease into the uninfected states.

A public meeting will be held in the afternoon at the Gardner Auditorium, State House, at 4:00 P. M. Dr. Francis will also be the speaker at this meeting.

The following editorial which appeared in the September issue of the *American Journal of Public Health* is timely and warrants the attention of our readers:

TULAREMIA

This disease, which is now attracting considerable attention, was first described by McCoy, in 1911, as "a plague-like disease of rodents," having been found in the routine examination of these animals carried on in San Francisco. The causative organism was named Bacterium Tularense.

In 1919 and 1920, Dr. Francis, of the U. S. Public Health Service, found the same disease in Utah, gave it its present name, and showed that it was spread by the deer fly. In that section it was known as "deer fly fever." It is called by market men "rabbit fever," owing to the fact that in the East, at least, it is kept alive in wild rabbits, and they are the chief source of infection for man. In this section, November, December and January are the months in which the majority of cases occur, since vast numbers of these animals are killed and sold for food.

The germ was isolated in 1912 by McCoy and Chapin. Spleens and livers of infected animals contain the germs.

The disease is extremely infectious and every laboratory man who has worked with the germ in this country and in England has contracted it. In nature, the deer fly and the wood-tick are apparently the chief agents in conveying the disease from animal to man. Under laboratory conditions, the mouse louse, the bedbug, the stable fly and the squirrel flea have been shown to be capable of transmitting the germ. Ticks harbor the infection in their feces, their circulatory fluid and in the epithelial cells of their intestinal tract. The germ is able to survive the winter in the tick, and may be transmitted from stage to stage in the development of the tick, and is transmitted through the egg to the next generation. Even the handling of an infected tick appears to produce infection, though the sucking period is the dangerous time. Certain flies seem to carry the infection for four days at the longest. The deer fly is commonly found on horses in Utah from May to September. The wood-tick is found in Montana and adjoining states, and is active in March, April, May and June. In other parts of the country, the ordinary wild rabbit seems to be the important source of infection. West of the Mississippi River, the jack rabbit is the chief agent in spreading the disease. It is used for bait, the feeding of chickens, dogs and foxes, as well as for the table.

During the last few years, a number of cases have

been reported from states in the East. Most of these have been found in and near Washington, D. C., probably due to the activity of Dr. Francis in that area. Twenty-two cases have been recorded, and of the patients, 17 have been engaged in dressing rabbits for the market.

The disease is not very fatal, the mortality being about 4 per cent. Among 420 recorded cases, 17 deaths have occurred, but these include only cases reported to the U. S. Public Health Service, which up to the present has been the body which has shown the greatest activity in studying the disease and its epidemiology. Cases have been reported from 37 states, the District of Columbia and Japan, but none from the New England states, the only area in this country known to be free.

There are two general types of the disease—one in which the glands become enlarged and painful, and are apt to go on to suppuration, and the other, seen in laboratory workers, which resembles typhoid fever. Fever, running as high as 104°, is always a symptom, and persists for from two to three weeks. The diagnosis is confirmed by agglutination with a known culture.

Special precautions must be taken in the diagnosis by agglutination, similar to those for typhoid fever. The reaction is absent during the first week, but comes on in the second week, often in low titer, though occasionally it will show agglutination in a dilution of 1 to 500 or even higher. The maximum agglutination appears during the third and fourth weeks. Agglutination in dilutions of 1 to 1200 is not uncommon, and takes place even up to 1 to 2500. At least 0.5 c.c. of blood is required, and more than this quantity is desirable. The reaction is very persistent, lasting for five years or more. No preservatives other than pure neutral glycerin should be added.

The disease has never been observed in domestic animals. There is no special treatment, no preventive vaccine, no curative serum, and no drug has been found which has any specific effect.

Fortunately the germ is easily killed in cooking, 133° F. being sufficient. Those who dress rabbits for market should wear rubber gloves, and since one attack protects against another, immune persons should be employed in this work as far as possible. Freezing for 30 days will render dead rabbits free from danger. Market inspection is of little value since the organs which carry infection—the liver and spleen—have been removed in dressing. Health officers and physicians who are called to cases which are not easy of diagnosis should remember to look for tularemia.

DEDUCTION OF EXPENSES OF PHYSICIAN IN ATTENDING CONVENTIONS IS ALLOWED

Contention of Petitioner Is Sustained in Decision Handed Down by the Board of Tax Appeals

Cecil M. Jack v. Commissioner of Internal Revenue, Docket Nos. 14995 and 17662, Board of Tax Appeals.

The tax payer contended here that he was entitled to a deduction for expenditures he had made in connection with attending conventions of medical associations. These expenditures were for railroad fare, hotel accommodations and meals. The Board of Tax Appeals sustained his contention, reversing the Commissioner of Internal Revenue. Other questions were decided adversely to the taxpayer because of lack of evidence.

Following is the full text of the findings of and the opinion:

Petitioner resides at Decatur, Ill., in which city he is engaged in the practice of medicine.

He expended during the years 1920, 1921, 1922 and 1923, the respective sums, $16, $230, $375 and $384.46 for railroad fare, accommodations and meals in connection with attending meetings and conventions of various medical associations. He deducted from gross income and Commissioner disallowed as deductions for said years the respective sums, $16, $230, $375 and $15.—*U. S. Daily*, October 16.

CORRESPONDENCE

CRITICISMS OF DOCTORS

To the Editor.
Dear Sir:

I have read with much interest the article "Should Doctors Tell the Truth," by Joseph Collins, M.D., in Harper's magazine for August. I "take off my hat," to Dr. Collins for his frank statement that most of the doctors do not tell the truth to their patients. He feels it is, however, better and kinder to the patient for the doctor often to prevaricate. But the difficulty is that a patient looks up to his doctor as a kind and wise friend who will help him if it is possible. He does not ask for the impossible, and it never occurs to him that the doctor will not tell him the whole truth.

I feel that there is entirely too much withholding of information and too much prevarication on the part of the members of the medical profession today. An untruth is generally found out sooner or later and when this happens the patient is apt to lose his respect for his doctor.

In olden times the doctors knew less than they do now and so cloaked themselves in mystery to conceal their lack of knowledge. Many of the traditions of the profession—the solemn bedside manner, the cryptic utterances—date from those days and were intended to impress upon the patient the conviction that he stood in the presence of one in whose hands rested the responsibilities of life and death. The scientific treatises were written in Latin, partly as a pretense to erudition, but more, perhaps, to impress the laity. One famous doctor who wrote an epoch-making discussion in English was severely taken to task.

Though we have few rights left us, one might think we had the right to our own bodies. Although some members of the profession maintain we do, this is not always the case. A patient, for instance, is sent to a hospital "for examination only" the surgeon says, but the examination sometimes develops into an operation without the situation having been discussed with the patient or his consent obtained. The poor man sometimes wakes up from ether maimed for life.

The patient should be given as full knowledge of his condition as is humanly possible upon which to base his decision. The right to an explanation is due him and the privilege should be given him to decide what he wants done and when. Because of the lack of a little explanation the mystery often

becomes almost as aggravating to the patient as the disease itself. Certainly some member of his family should under any circumstances be told the truth, but preferably the patient himself.

It is also a fact that physicians sometimes do not take into consideration the patient's private life or financial condition. They may not have sized up the man correctly. Before going to the hospital he perhaps has not made his will, or his business affairs are not sufficiently in order to cover the period of time taken up by a serious illness. Often this means hardship for his family.

There is too much observance of etiquette among the profession and there are too many "cliques" today. It is shocking how many patients are sent off traveling when nothing can be done for them and when they are not really well enough to go. Some doctors are unbelievably careless. A case has recently come to my attention in which it was stated that for a metabolism test laughing gas was given carelessly instead of oxygen, a nurse as well as the doctor being present and this is only one of a number of mistakes I could tell about. Mistakes do not happen so often in Europe I understand because of their laws. Doctors are obliged to be more careful or they get into trouble. It might be well to adopt some of their methods in this country. For instance fees. This is a subject not well regulated here. The rich are made to pay handsomely on the idea that surgeons give their services to the poor, and after all the doctors must live and so be paid by some one. It seems one reason why teachers are paid so little is that there are too many of them. Is this perhaps the case with the Medical profession? It certainly seems as if a great deal of money went into handsome school buildings and hospitals often only half filled. Would it not perhaps be better to have fewer hospitals and physicians and regulate the sum and pay our doctors better?

A few well known surgeons have the system of making enquiries as to the income of their patients and making them pay accordingly. This system has lately in some instances been adopted for charities. Most people consider this an impertinence and these charities and doctors are avoided.

Doctors are themselves notoriously poor patients, perhaps because they know too much of the ins and outs of their trade. I fear I seem to be a little hard on them, but I know there are many fair and brilliant men among them who work tirelessly without pay. Nevertheless, it seems to me that the surgeons take too much responsibility on themselves and their power is too great today. There is a lot of unnecessary and hurried and radical operating and experimenting on human lives to say nothing of the use of the X-ray and radium which are more or less dangerous at best. We cannot do without physicians and surgeons, but what we want is to be able to continue our admiration and respect for them. I hope both doctors and patients will answer this letter.

ISABEL ANDERSON.

Boston, Dec. 30—27

OFFICIAL ACTIONS BY THE BOARD OF REGISTRATION IN MEDICINE

At a meeting of the Board of Registration in Medicine held October 18th, the following cases were acted upon:

Dr. Charles F. Berry, 541 Commonwealth Avenue, Boston, charged with alleged agreement to perform an abortion and medical treatment for the purpose of producing an abortion. Placed on probation for one year.

Dr. Arthur A. Lawrence, 265 Newbury Street, Boston, charged with alleged agreement to perform an illegal operation. Certificate of registration revoked.

Dr. George P. Paschal, 109 Broad Street, Lynn, charged with revocation of Federal Prohibition Permit and violation of the local liquor laws. Placed on probation for one year.

Dr. Emily F. Murphy, Taunton, revocation of Federal Prohibition Permit. Case dismissed.

FRANK M. VAUGHAN, M.D., *Secretary.*

FREE PROVISION FOR ANTI-RABIC TREATMENT

October 18, 1928.

Dear Mr. Editor:—

Notwithstanding the letter of Dr. Bigelow in the October fourth number of the JOURNAL, it does not seem to me as very unreasonable to ask for free provision of antirabic treatment by the state to indigent individuals so unfortunate as to be bitten by rabid dogs. New York state has made such provision since 1916. In Massachusetts existing laws governing the situation appear ineffective; as shown by my personal experience, as implied in Dr. Bigelow's own statement in his letter where he says "if, however, local boards refuse to do this ("this" refers to ordering the material at the expense of the local board of health) it seems that under our form of government the citizens in the last analysis are responsible for perpetuating official futility" and as indicated by some statements in print critical by Dr. Bigelow of local boards of health.

Dr. Bigelow states that because rabid human beings do not spread the disease by biting others, so the state ought not to provide antirabic treatment and yet the state does prepare other biologic products as antipneumococci sera and antimeningococcic sera whose use is only curative showing that he is inconsistent in what is covered under his heading (1) in his letter of October fourth.

His heading (2) concerning control of dogs as a preventive measure is extraneous to the argument and needs no answer. I made no claim that preventing the horrible clinical picture of rabies in man by provision that would ensure preventive inoculation to everyone bitten by a rabid dog would influence in any way the spread of rabies by dogs.

Personally I greatly regret Dr. Bigelow's unwillingness to seek legislation and funds to provide free antirabic treatment to indigent citizens of Massachusetts bitten by rabid dogs because I feel sure that so long as it is left in the hands of local boards of health, in the future the provision will continue to be ineffectual as in the past. However, so long as Dr. Bigelow remains so satisfied with existing conditions as is indicated in his letter of October fourth, it is useless to say more.

Very truly yours,

HENRY A. CHRISTIAN.

RECENT DEATHS

HUBBARD—Death has claimed DR. JOSIAH CLARK HUBBARD, a retired Fellow of the Massachusetts Medical Society, who died at his home in Holyoke October 1, 1928, at the age of 75, shortly after his re-

turn from a tour of Europe, where he was taken ill while in England.

Dr. Hubbard, only son of Eli Andrews and Francis Daniels Hubbard, was born in Easthampton Sept. 5, 1853. When he was 12 years of age, with his parents he removed to Springfield, receiving his early education in that city and later finishing his college preparatory training at a private school in Northampton conducted under the supervision of Josiah Clark.

In the fall of the year following his graduation from the Northampton School he entered Williams College from which he was graduated with a degree of A.B. in 1877 and then immediately began the study of medicine with Dr. Morris Longstreth of Philadelphia. He entered the Jefferson Medical College in Philadelphia, received his medical degree in 1880 and served as resident physician at Howard Hospital, Philadelphia, and then went to Holyoke where he practiced up to April of this year, retiring after 56 years of service.

In addition to his private practice Dr. Hubbard served on the staff of Holyoke Hospital as superintendent for many years and also on the staff of Providence Hospital. For a number of years he was a trustee of the People's Savings Bank. He was a Fellow of the American Medical Association, and a member of the Second Congregational Church.

He was married on April 21, 1881, to Mary Stowe of Springfield, a daughter of William Stowe, former postmaster in that city. After her death he married Bertha G. Batchelor, who survives him.

GUILD—Dr. Edward Frank Guild died at his home in Chelsea, October 12, 1928, aged 64.

He was born in Saxonville, Mass., March 27, 1864, graduated at Dartmouth Medical School in the class of 1893, engaged in the general practice of medicine at Hillsboro, N. H., where he remained for a short time, thence went to Chelsea about 35 years ago and has practised there since.

He had been chairman of the Chelsea Board of Health, city physician, trustee of the public library and member of the Staff at the Chelsea Memorial Hospital, was a Fellow of the Massachusetts Medical Society and a Mason. He is survived by his wife, three sisters and a brother.

MILLER—The Journal chronicles with regret the death at a Boston hospital, on October 14, 1928, of Dr. Ernest Parker Miller, of Fitchburg, at the age of 77. Dr. Miller was born in Ashburnham, January 4, 1851, the son of Dr. Alfred Miller and Elsie (Kibling) Miller. His father, a Fellow of the Massachusetts Medical Society, practised medicine before him in Ashburnham and Fitchburg. Dr. Ernest Miller was educated in the schools of Fitchburg and attended Amherst College for two years, but transferred to Harvard College, graduating with the class of 1872. He then became a student at Harvard Medical School, graduating in 1877, having been an interne at the Massachusetts General Hospital and Boston Lying-in Hospital. He settled in practice in Fitchburg and was appointed medical examiner for the third Worcester District in 1877, the year of his graduation, at the inauguration of the medical examiner system in that year. He continued in office until 1891 and became a member of the Massachusetts Medico-Legal Society. Dr. Miller joined the state medical society on receiving his degree in medicine, his name being placed on the retired list in 1923. In 1878 he was city physician of Fitchburg; he was on the staff of the Burbank Hospital and from 1883 to 1893 was a pension surgeon. He married Myra B. Richardson, daughter of the late Nathan Henry and Martha Barber Richardson, who died in 1927, and who was a sister of the late Dr. Maurice H. Richardson, prominent Boston surgeon. Dr. Miller was the father of Dr. Richard Henry Miller, one of the surgeons at the Massachusetts General Hospital. He was instrumental in founding the Fitchburg Anti-tuberculosis Society. A room in the new Harvard Medical School dormitory, Vanderbilt Hall, was given in his name.

MORGAN—Dr. James Raymond Morgan, dermatologist and bacteriologist of Providence, R. I., died at the Rhode Island Hospital, September 25, 1928, at the age of 80, from pneumonia.

Dr. Morgan, son of James Rogers Morgan and Jane Gray Raymond Morgan, was born in Waterford, Conn., September 28, 1847. He was graduated from Harvard Medical School in 1873, and spent the next year studying medicine at Vienna. He served an interneship of a year at the Rhode Island Hospital and a similar term at the Boston City Hospital, joining the Massachusetts Medical Society in 1873 and transferring to the Rhode Island Society in 1874, when he returned from study abroad and settled in Providence. Under his leadership the dermatological department was established in the Rhode Island Hospital, and throughout his life he was actively interested in the success of the department.

In 1892 he married Miss Jennie Ellen Warren, daughter of Dr. W. W. J. Warren of Lyme, Conn. She died May 15, 1926. They had no children.

Dr. Morgan retired from practice about eight years ago. Since 1922 he had been confined to a wheel chair in his home at 12 Adelphi Avenue.

OBITUARIES

ELIZA MARIA MOSHER, M.D.

This eminent woman physician, one of the oldest practising the healing art, died at a sanatorium in New York City, October 16, 1928, at the age of 82, following a fracture of the leg, suffered when she tripped over a rug and fell at the entrance of the Plymouth Congregational Church, (in Brooklyn, where she lived) last March. The daughter of Augustus and Maria Sutton Mosher, she was born at Cayuga, N. Y., in 1846. In the face of the objections of her Quaker parents she entered the New England Hospital for Women and Children, in Roxbury, as a house pupil, in 1866, having been graduated from Friends' Academy at Union Springs, N. Y., four years previously. When, in 1869, the University of Michigan opened the doors of its medical school to women, Eliza Mosher became a student of medicine there and received an M.D. in 1875. Then she opened an office for private practice in Poughkeepsie, N. Y., with her classmate, Dr. Elizabeth Gerow, two years later moving to Sherborn, Mass., to become resident physician to the Massachusetts State Reformatory for Women. During the next two years she devoted herself to the duties of this position when she went abroad for medical study, returning to be superintendent of the same institution from 1881 to 1883. Her next occupation was that of associate professor of physiology and resident physician to Vassar College, an office

she relinquished in 1886 to settle in the practice of medicine in Brooklyn. Dr. Mosher lectured at Wellesley College and at the Chautauqua Summer School, being first vice-president of the board of directors of the latter for twenty years. In 1896 she was made professor of hygiene and women's dean at the University of Michigan, retaining the positions until 1902. After that date she lectured at the Chautauqua Summer School on physiology and at Adelphi College, Brooklyn, on hygiene.

She was a founder of the American Posture League, and her studies in posture have been considered important. She designed the seats in several types of rapid transit cars, and was the inventor of a kindergarten chair.

She was a member of the American Medical Association, the New York State and Kings County Medical Societies, the American Public Health Association, the American Electro-Therapeutic Association, the New York Medico-Legal Society, the Society for the Study of Internal Secretions and the New York City and State Women's Medical Associations, and honorary President of the Medical Women's National Association.

Dr. Mosher represented the last named body at the International Congress of Medical Women at Geneva in 1923. She was the author of a book, "Health and Happiness, a Message to Girls," 1911. For more than twenty years she had been senior editor of the *Medical Women's Journal*, and had contributed to many other medical publications.

Dr. Mosher was an active member of the Milk Commission of Kings County Medical Society for more than twenty years, and more recently was appointed Chairman of the Cleaner Brooklyn Committee of the Brooklyn Chamber of Commerce.

Last year she went to Ann Arbor to turn over the first sod for the construction of the new Women's League Building at the University of Michigan. In that building an "Eliza B. Mosher Hostess Room" will be dedicated to her memory.

ANDREW H. HODGDON

The death of Dr. Andrew H. Hodgdon has brought sorrow to his patients and his friends. He was the beloved family physician to his patients, and an honored citizen. To his friends he was a lovable man, to his patients, a wise physician and a warm personal friend.

As a Classmate, who entered Harvard with him in the fall of 1875, there was an opportunity to know him well, and the knowledge of his skill as a physician came from three years in the Medical School and a year and a half as Medical Officer at the Massachusetts General Hospital, and of his work as a physician for over forty years. He commanded the respect and the affections of his Classmates, patients and friends.

Andrew H. Hodgdon was born in West Cambridge (now Arlington) in October, 1857, and was the son of a well known physician of that town. He entered Harvard College in the fall of 1875, in the Class of 1879, graduated, and entered Harvard Medical School. After three years he was appointed House Officer in the Medical Service of the Massachusetts General Hospital and afterwards served six months at the Boston Lying-in Hospital. He started practice in Dedham in 1884. In 1888, he was married to Anna Florence, daughter of Judge Waldo Colburn, and he was appointed Medical Examiner for the Norfolk District in 1884, serving in that office for forty-four years. In 1895, he wrote that he was often working twenty hours out of the twenty-four. Later on, he served on the School Committee, being a member for twenty-four years, and the last twelve years of that time he served as Chairman. He had been a member of the Library Board, and he was a prominent member of the Unitarian Church, and had been Chairman of the Parish Committee. Later on, he was a Director of the Dedham National Bank, and President of the Dedham Institute for Savings, also a Director in the Dedham Mutual Fire Insurance Company.

This brief summary does not by any means cover the extent of this man's work in the community in which he lived. Many are the instances of kindness he has done for his fellow practitioners, and the charity he showed to patients is beyond belief. He did not confine himself solely to his medical work, as so many of his profession do, but, by the different offices held, he was of service not only to the community in which he lived but also to the Commonwealth.

Any man who has had much experience serving on a School Committee recognizes that the Chairman of such a committee must be a man of broad mind, of great resources, and of infinite tact. When dealing with his immediate professional duties he was a man of the highest type. He kept himself well equipped with modern methods, and used rare judgment in handling the cases of the patients who came under his care.

Certainly the life of such a man is a memory that lives after him, and I believe we can truly say of him

"Well done, thou good and faithful servant."

WM. M. CONANT, M.D.

NEWS ITEMS

THE LAYING OF THE CORNER STONE OF THE ADMINISTRATION BUILDING OF THE METROPOLITAN STATE HOSPITAL IN WALTHAM—Governor Fuller participated in the exercises incident to the laying of the corner stone of the new Metropolitan Hospital for Mental Diseases at Waltham, October 17, 1928.

Dr. George M. Kline, Commissioner of Mental Diseases for Massachusetts, told of the work of his department in caring for the mentally ill of the State.

This hospital will cost about $3,000,000 and will be a part of the $30,000,000 already spent and planned for buildings and land for the care of this class of patients.

There are now about seventeen thousand mental cases under State supervision. It is generally conceded that Massachusetts stands in the forefront of States in caring for those suffering with mental disabilities.

This addition will provide accommodations which are very much needed.

HARVARD MEDICAL SCHOOL NEWS

On October 19, 1928, at 5:00 P. M., in Building C Amphitheatre of the Harvard Medical School, Professor H. H. Dale, Director of Research at the Na-

tional Institute for Medical Research, Hampstead, London, England, spoke on the subject, "Chemical Control of Vascular Tone." Dr. W. B. Cannon introduced the speaker.

Vasomotor tone, said Professor Dale, is controlled through the nervous system, and by two circulating hormones, epinephrin and pituitrin. Of epinephrin we know its exact chemical structure and its action on blood vessels both by itself and through the sympathetic system. Of pituitrin, on the other hand, we know very little. It reaches the circulation through the cerebrospinal fluid, and thus is not useful in an emergency due to its slow absorption. From experiments on frogs Krogh thinks it maintains capillary tone, but extirpation of the posterior lobe of the pituitary gland does not necessarily give loss of capillary tone. The normal function of both is, however, the maintenance or intensification of vascular tone.

Opposed to this constrictor action is the dilator effect. This is obtained by stimulation of the craniosacral autonomic nervous system, by artificial peripheral stimulation of sensory nerves, or by an exon reflex. Can these effects, questions Professor Dale, be produced by chemical agents in the body?

Histamine is one of those substances which produce vaso-dilation. When the various organs and tissues of the body are extracted, a substance which is proven chemically to be histamine is obtained. The amount in the different tissues varies, being greatest in lung, next highest in skin, a medium amount in liver, and very little in muscle. The cause of the great amount in lung tissue may be that the lung secretes histamine to counteract epinephrin in the blood, or perhaps the lung acts as a filter for histamine in circulation.

The old idea, for which there is little support, is that histamine is in the cells and is liberated by crushing. The most recent work has been done by Sir Thomas Lewis. Injection of histamine is followed by a local red reaction and a wheal; this action is independent of the nervous system, because if the nerve is cut, the same reaction occurs. An oedematous area contains less histamine than normal, thus proving that it is not formed by injury, but is already present. The substance liberated during life in response to injury has the same physiologic action as histamine, but we cannot prove them to have the same chemical structure. Lewis calls this substance the "H" substance. There are two possibilities: (1) histamine may be liberated as a complex substance which is unstable and split up by extraction, or (2) the substance which can be obtained from animals may be different from the human product.

Choline is a similar-acting drug to histamine. If choline is esterized to acetyl-choline its dilator action is intensified. Perhaps there is acetyl-choline in the body so unstable that we cannot demonstrate it. If a fresh horse spleen is extracted, the reaction obtained from the extract is more than can be attributed to histamine. If the solution is made alkaline, allowed to stand, and neutralized, no action is obtained, thus proving the substance to be an ester. The action of the fresh solution and known acetyl-choline on denervated skeletal muscle is almost identical.

Professor Dale's speculations on this were that the "H" substance of Lewis is in the cells of the skin, and that a new "C" substance, possibly acetyl-choline, is found at the end of the nerve over the arterial wall.

The lecture was illustrated by lantern slides and was well attended.

DR. WILLIAM PECKHAM STUTSON, aged 81, of Cummington, suffered a fractured left hip Wednesday night, October 17, and is confined at Cooley-Dickinson Hospital, Northampton.

DR. JOHN S. HODGSON'S APPOINTMENT—Dr. John S. Hodgson has been appointed visiting Neurological Surgeon at the Cancer Hospital at Pondville. Dr. Hodgson is Associate in Neurological Surgery at the Massachusetts General Hospital and through his association with the Pondville hospital will contribute further to sustaining the excellent quality of service.

NOTICES OF MEETINGS

HAMPDEN DISTRICT MEDICAL SOCIETY

The regular Fall Meeting of the Society will be held at the Skinner Clinic, Holyoke Hospital, Beech Street (near Northampton Street), Holyoke, on Tuesday, October 30, 1928, at 4:15 P. M.

Papers for the afternoon:

"Notes on the Use of Pins and Tongs in the Reduction of Fractures," E. A. Knowlton.

"Dysmenorrhoea," by W. W. Chipman, prepared in collaboration with and read by J. F. C. Forster.

Elmer Harrington will show some interesting X-ray plates if time permits.

Supper at 6 P. M. at expense of Society.

HERVEY L. SMITH, *Secretary.*

THE NORFOLK DISTRICT MEDICAL SOCIETY

CENSORS' MEETING

The Censors' meeting of the Norfolk District Medical Society will be held on November 1, 1928, at the Roxbury Masonic Temple, Warren Street, Roxbury, at 4 P. M. instead of November 8 as previously stated.

TRUDEAU SOCIETY

The next meeting of the Trudeau Society of Boston will be held on Tuesday evening, November 13, 1928, at 8:15 p. m., in Sprague Hall, Boston Medical Library, 8 The Fenway, Boston.

The speaker will be Dr. Harlan F. Newton of Boston; subject: "Observations of the Surgical Treatment of Pulmonary Tuberculosis in Europe."

Physicians, medical students and nurses are cordially invited to attend this meeting.

RANDALL CLIFFORD, *Secretary.*

THE NORFOLK DISTRICT MEDICAL SOCIETY

A stated meeting of the Society will be held in the Pondville Hospital, Wrentham, Mass., October 30, 1928, at 4 P. M. Telephone Walpole 0385.

The Hospital entrance is on the left from the main road to Wrentham, 3½ miles beyond Walpole, and is marked by a sign.

Dr. Lyman A. Jones, Superintendent, and Dr. Ernest M. Daland, Chief of Staff, have arranged a very

interesting program and it is hoped that the attendance will be large.

Program:

4 P. M. Inspection and ward visits.

5:30 P. M. Business meeting followed by presentation of 10-minute papers by the Staff.

6:30. Collation.

Massachusetts has undertaken the diagnosis and treatment of cancer as a governmental function. Whether this policy be beneficial to the patient and physician your attendance at this meeting should enable you to decide intelligently.

FRANK S. CRUICKSHANK, M.D., *Secretary*,
23 Bay State Road, Boston.

SUFFOLK DISTRICT MEDICAL SOCIETY

CENSORS' MEETING

The Censors of the Suffolk District Medical Society will meet for the examination of candidates at the Medical Library, No. 8 The Fenway, Thursday, November 1, 1928, at 4:00 o'clock.

Candidates should make personal application to the Secretary, and present their medical diploma at least one week before the examination.

ARTHUR H. CROSBIE, *Secretary*.

520 Commonwealth Avenue.

NEW ENGLAND SURGICAL SOCIETY TENTH MEETING

New Haven, Conn.

NOVEMBER 9 AND 10, 1928

The Annual Meeting of the New England Surgical Society will be held at New Haven, Conn., on Friday, November 9, and Saturday, November 10.

Reservations should be made as early as possible at the Hotel Taft through Doctor W. E. Hartshorn, 67 Trumbull Street, New Haven, Conn.

All meetings will be held at the New Haven Hospital.

Buffet Luncheons will be served at the New Haven Hospital.

Annual Dinner at the New Haven Lawn Club or the New Haven Country Club, Friday evening, November 9.

Arrangements will be made to entertain the ladies.

Social Arrangements:

Yale-Maryland Football Game, November 10, at 2 P. M.

Golf privileges will be available at the New Haven Country Club and at the new Yale Golf Course.

Members who care to remain over Sunday will be shown over the University, or can play Golf at one of the above named Courses.

FRIDAY MORNING, NOVEMBER 9

There will be a symposium on Medical and Surgical Aspects of Large Bowel Affections, followed by a Clinic.

FRIDAY AFTERNOON, NOVEMBER 9

There will be a Literary Program consisting of six diversified papers by members of the Society.

FRIDAY EVENING, NOVEMBER 9

The Annual Dinner. At the Annual Dinner there will be a discussion on the subject, "The Nursing Problem." Discussion will be started by Professor Winslow of Yale. Doctor Bigelow, Commissioner of Health of Massachusetts, and Doctor James Stone.

SATURDAY MORNING, NOVEMBER 10

There will be a symposium on Pelvic Surgery, followed by an Operative Clinic.

SATURDAY NOON, NOVEMBER 10

The Annual Business Meeting will take place at noon.

JOHN M. BIRNIE, M.D., *Secretary*.

THE MASSACHUSETTS CENTRAL HEALTH COUNCIL

The Massachusetts Central Health Council will hold a meeting on Wednesday, October 31, at dinner beginning at 6:30 p. m. at Hotel Bancroft, Worcester. The dinner will be followed by a business meeting of the Council, following which a formal program will be presented.

The subject for discussion will be "The Problem of the Relations Between Public Clinics and the Private Practitioner of Medicine". Dr. George H. Bigelow, State Commissioner of Public Health, and Dr. Alec N. Thomson, Secretary of the Public Health Committee of the Medical Society of the County of Kings, will present papers. Representatives of the Constituent Organizations of the Council will be invited to discuss the subject. Dr. Henry B. Elkind, President of the Council, will preside.

The constituent organizations of the Council are: American Society for Control of Cancer, Dental Hygiene Council of Massachusetts, Massachusetts Association of Boards of Health, Massachusetts Association of Directors of Public Health Nursing, Massachusetts Department of Public Health, Massachusetts Medical Society, Massachusetts Society for Mental Hygiene, Massachusetts State Nurses' Association, Massachusetts Tuberculosis League, Massachusetts Veterinary Association, and New England Heart Association.

Tickets for the dinner will be $2.00 each and all persons interested in the subject are invited to attend. The Secretary of the Council is Frank Kiernan, 1149 Little Building, Boston, to whom requests for tickets and information should be addressed.

SOCIETY MEETINGS

October 31 — Massachusetts Central Health Council. Complete notice elsewhere on this page.

Combined Meetings of the Boston Medical Library, the Suffolk District Medical Society, the Middlesex South District Medical Society and the Norfolk District Medical Society

October 31, 1928—Stated meeting. Symposium by the Staff of the Children's Hospital. See notes under Suffolk District Medical Society (page 800, issue of October 18).

November 21, 1928—Meeting in association with Norfolk District Medical Society. Dr. Frederick W. O'Brien will read the paper entitled "Recent Advances in Physical Therapy" and Dr. Edwin T. Wyman will open the discussion.

December 19, 1928—Surgical Section. Symposium on Stomach Surgery. "Operative Procedures; Indications and Results," Dr. R. H. Miller; "Selection and Management of Patients for Gastric Surgery," Dr. H. M. Clute; "Acute Perforations of Stomach and Duodenum," Dr. W. R. Morrison; "Results of a Series of Stomach Operations," Dr. E. S. Emery, Jr. Discussion by Doctors David Cheever, Edward P. Richardson, Frank H. Lahey and I. J. Walker.

January 30, 1929—General meeting in association with Boston Medical Library. "Heredity," Professor George H. Parker, Harvard University.

February 27, 1929—Medical Section. "The Newer Knowledge of Nutriment," Dr. Lafayette B. Mendel (exact title to be submitted later), Yale University Medical School.

March 27, 1929—Meeting in association with Middlesex South District Medical Society. Clinical and Experimental Studies of Obstructing Jaundice and Its Complications. Dr. Waltman Walters, Mayo Clinic.

April 24, 1929—Annual meeting. Speaker, Dr. Walton Martin, New York City. Title to be announced later.

The medical profession is cordially invited to attend all these meetings.

November 9-10—New England Surgical Society, Tenth Meeting. Complete notice appears on page 854.

November 13—Trudeau Society. Complete notice appears on page 799, issue of October 18.

December 3-7—Radiological Society Convention. Detailed notice appears on page 712, issue of May 17.

DISTRICT MEDICAL SOCIETIES

Barnstable District Medical Society

Schedule of Meetings: November 1, 1928, February 7, 1929, May 2, 1929.

Bristol North District Medical Society

April 18, 1929—Spring meeting.

Bristol South District Medical Society

Meetings will be held November 7, 1928, and May 2, 1929. Complete notices will appear later.

Essex North District Medical Society

November 1, 1928 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill (Tel. 3430), at 2 P. M.

January 2, 1929 (Wednesday)—Semi-annual meeting at Haverhill, at 12:30 P. M.

May 1, 1929 (Wednesday)—Annual meeting at Lawrence, at 12:30 P. M.

May 2, 1929 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill, at 2 P. M. (Tel. 3430.)

Essex South District Medical Society

November 1, 1928 (Thursday)—Censors meet for examination of candidates at Salem Hospital at 3:30 P. M. Candidates should apply to the Secretary (Dr. R. E. Stone, Beverly) at least one week prior.

November 7, 1928 (Wednesday)—Salem Hospital. Clinic at 5 P. M. Dinner at 7 P. M. Speaker: Dr. Harry Solomon, Boston. Subject: Syphilis of the Nervous System. Discussion by Drs. W. V. McDermott of Salem and C. A. Bonner of Hathorne (10 minutes each). Discussion from the floor.

Further announcements will follow.

Franklin District Medical Society

Meeting will be held on the second Tuesday of November, January, March and May.

Hampden District Medical Society

October 30—See page 853 for complete notice.

Hampshire District Medical Society

December 12—Address by Dr. Philemon Truesdale.

March 13, 1929—Address by Dr. George E. Gage, Professor of Bacteriology and Physiology at the Massachusetts State College.

Middlesex East District Medical Society

The following schedule of meetings has been arranged for the coming year:

November 14—Woburn.
January 16—Wakefield.
March—Reading.
May—Melrose.

Subjects and speakers to be arranged by committees in each city or town.

Middlesex North Medical Society

The winter meeting will be held the last Wednesday in January.

The annual meeting will be held the last Wednesday in April.

Middlesex South District Medical Society

March 27, 1929—Joint meeting with the Suffolk and Norfolk Districts.

April, 1929—Annual meeting. Definite date to be announced later.

Norfolk District Medical Society

Below are the proposed meetings of the Norfolk District Medical Society for the 1928-29 Season. The schedule below will be adhered to as strictly as possible. The carrying out of the proposed plan will, of course, depend upon the acceptances of invitations extended to the speakers. Minor changes may be necessary.

October 30—Pondville Hospital. Dr. Lyman F. Jones, Superintendent. Inspection, 4 P. M.; Business Meeting at 5:30; Papers by the Staff; Collation. Complete notice appears on page 853.

November 21—Boston Medical Library. In combination with Suffolk District and Middlesex South District Societies. Subject, Recent Advances in Physical Therapy. Dr. Frederick W. O'Brien and Dr. Edwin T. Wyman.

January 29—Roxbury Masonic Temple. Subject, Treatment of Varicose Veins by the Injection Method—Dr. E. E. O'Neil. Dr. Homans will open the discussion.

February 25—Roxbury Masonic Temple. Dr. W. R. Ohler. Subject to be announced. Discussion to be opened by Dr. A. A. Hornor.

March 29—Roxbury Masonic Temple. Subject and speakers to be announced.

May, 1929—Annual meeting program to be announced.

The Censors of the Society meet November 1, 1928, and May 9, 1929, at the Roxbury Masonic Temple, Warren Street, Roxbury, at 4 P. M., for the examination of candidates.

Suffolk District Medical Society

October 31, 1928 (Wednesday), at 8 P. M.—Children's Hospital, 300 Longwood Avenue, Roxbury. Stated meeting. Symposium by the Staff of the Children's Hospital: "Sepsis of Bones and Joints," Dr. Robert B. Osgood; "Moving Pictures as Hospital Records," Dr. Kenneth D. Blackfan; "Fractures of the Lower End of the Humerus," Dr. William E. Ladd; "Foreign Bodies in the Bronchus," Dr. Lyman G. Richards. This symposium will be held in the amphitheater of the Children's Hospital. Entrance on Vila Street, Roxbury.

November 1—Censors' meeting. See page 799, issue of October 18, for detailed notice.

March 27, 1929—Meeting in association with Middlesex South District Medical Society. "Clinical and Experimental Studies of Obstructive Jaundice and Its Complications," Dr. Waltman Walters, Mayo Clinic.

April 24, 1929—Annual meeting. Speaker, Dr. Walton Martin, New York City. Title to be announced later.

LINCOLN DAVIS, M.D., President.
ARTHUR H. CROSBIE, M.D., Secretary.

Worcester North District Medical Society

January 22, 1929 (Tuesday)—At Henry Heywood Memorial Hospital, Gardner, by invitation. Program by Staff.

Annual meeting the fourth Tuesday in April.

BOOK REVIEW

Constitutional Inadequacies, An Introduction to the Study of Abnormal Constitutions, by NICOLA PENDE, Translated by Sante Naccarati. Lea & Febiger, Philadelphia, 1928, pp. 248.

This book is divided into a general concept and localized inadequacies of human constitution. In the first part, the definition, the strength and weakness, and the classification of types of the constitution are described; and in the second constitutional anomalies and inadequacies of the skin, the skeletal system, the blood, the circulatory, respiratory, digestive, urogenital, endocrine, and nervous systems are considered. One chapter at the end is devoted to the therapy of constitutional inadequacies, and another to the modern analysis of individual biotypes.

For those interested in the tenets held by constitutionalists, the book should prove interesting, but for ordinary physicians the comparisons and observations appear more like fancy than fact; and very much removed from any bearing on the alleviation or prevention of human suffering. The book is written in a very technical form and without the glossary would be difficult to understand. Several illustrations of certain types are helpful. The observations and opinions of other authors are frequently given but without references. The book contains a good index.

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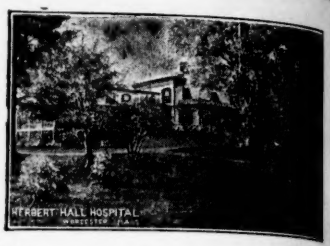

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